

Service Service Service

SK5.0L CA

H_17220_000.eps
210607

Service Manual

Contents	Page
1. Technical Specifications, Connections, and Chassis Overview	2
2. Safety Instructions, Warnings, and Notes	4
3. Directions for Use	5
4. Mechanical Instructions	6
5. Service Modes, Error Codes, and Fault Finding	8
6. <i>Block Diagrams, Test Point Overview, and Waveforms</i>	
Block Diagram Chassis	9
Schematic Overview Chassis	10
7. <i>Circuit Diagrams and PWB Layouts</i>	
Mono Carrier: Power Supply (A1)	11 19-20
Mono Carrier: Line Deflection (A2)	12 19-20
Mono Carrier: Frame Deflection (A3)	13 19-20
Mono Carrier: Tuner IF (A4)	14 19-20
Mono Carrier: AV Switch (A5)	15 19-20
Mono Carrier: Tone Control (Optional) (A6)	16 19-20
Mono Carrier: Audio Amplifier (A7)	17 19-20
Mono Carrier: CPU & Decoder (A8)	18 19-20
CRT Board (B)	21 19-20
Keyboard Control Panel (D)	22 23
Mains Filter Panel (E)	24 24
Side A/V Panel (G)	25 25
8. Alignments	29
9. Circuit Descriptions, Abbreviation List, and IC Data Sheets	34
Abbreviation List	35
IC Data Sheets	36
10. Spare Parts List	51
11. Revision List	54

©Copyright 2007 Philips Consumer Electronics B.V. Eindhoven, The Netherlands.
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.



PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

- 1.1 Technical Specifications
- 1.2 Connection Overview
- 1.3 Chassis Overview (Mechanical chassis)

Note: Data below can deviate slightly from the actual situation, due to the different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	: CRT
Screen size	: 29" (72 cm), 4:3
Tuning system	: PLL
TV Colour systems	: NTSC, PAL M, N
Video playback	: NTSC,
Preset/channels	: 181 channels
Tuner bands	: VHF
	: UHF

1.1.2 Sound

Sound systems	: Stereo, SAP
Maximum power (W_{RMS})	: 2 x 5

1.1.3 Miscellaneous

Power supply:	
- Mains voltage (V_{AC})	: 100 - 240
- Mains frequency (Hz)	: 50 / 60
Ambient conditions:	
- Temperature range ($^{\circ}C$)	: -5 to +45
- Maximum humidity	: 90% R.H.

Power consumption	
- Normal operation (W)	: ≈ 105
- Stand-by (W)	: < 3

1.2 Connection Overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Rear and Side Connections

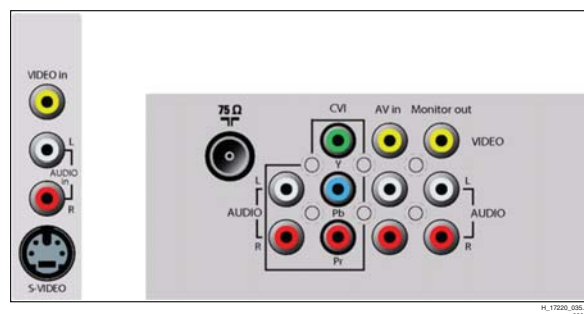


Figure 1-1 Rear and Side Connections

Aerial - In

- F-connector	Coax, 75 ohm	D
---------------	--------------	---

Cinch: Video YPbPr - In

Gn - Video Y	1 V_{PP} / 75 ohm	j q
Bu - Video Pb	0.7 V_{PP} / 75 ohm	j q
Rd - Video Pr	0.7 V_{PP} / 75 ohm	j q
Wh - Audio L	0.5 V_{RMS} / 10 kohm	j q
Rd - Audio R	0.5 V_{RMS} / 10 kohm	j q

Cinch: Video CVBS - In, Audio - In

Ye - Video CVBS	1 V_{PP} / 75 ohm	j q
Wh - Audio L	0.5 V_{RMS} / 10 kohm	j q
Rd - Audio R	0.5 V_{RMS} / 10 kohm	j q

Cinch: Video CVBS - Out, Audio - Out

Ye - Video CVBS	1 V_{PP} / 75 ohm	k q
Wh - Audio L	0.5 V_{RMS} / 10 kohm	k q
Rd - Audio R	0.5 V_{RMS} / 10 kohm	k q

1.3 Chassis Overview (Mechanical chassis)

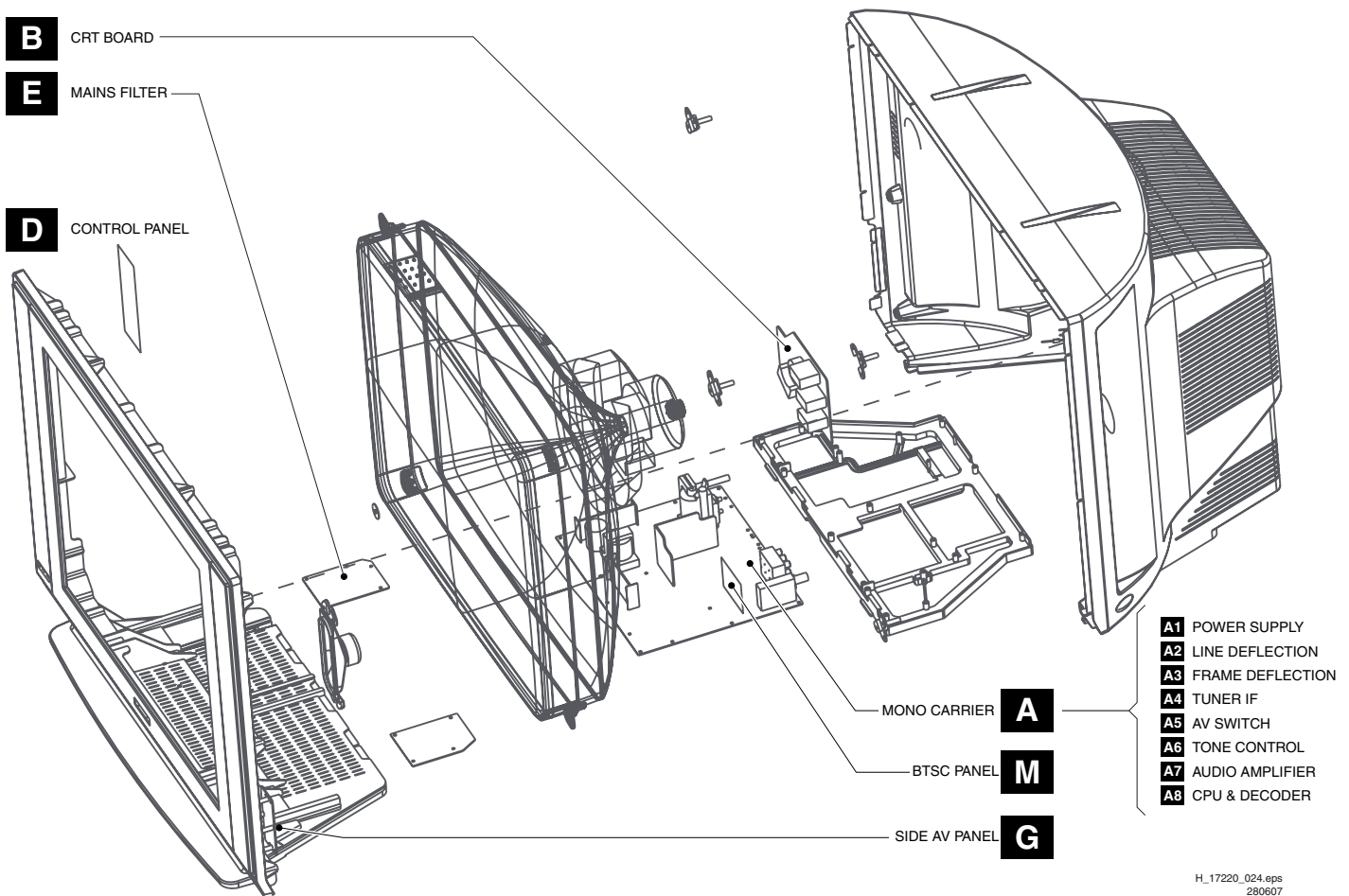


Figure 1-2 PWB location

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

- 2.1 Safety Instructions
- 2.2 Maintenance Instructions
- 2.3 Warnings
- 2.4 Notes

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol h , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current flows. In particular this is valid for the:
 1. Pins of the line output transformer (LOT).
 2. Fly-back capacitor(s).
 3. S-correction capacitor(s).
 4. Line output transistor.
 5. Pins of the connector with wires to the deflection coil.
 6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
 1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
 2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:

1. Perform the "general repair instruction" noted above.
2. Clean the power supply and deflection circuitry on the chassis.
3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in figure "Discharge picture tube", to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_{DC}). Discharge until the meter reading is 0 V (after approx. 30 s).

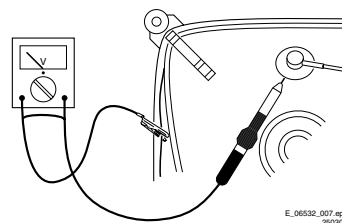


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD w). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and prevents circuits from becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (H), or hot ground (I), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (D) and without (E) aerial signal. Measure the voltages in the power supply section both in normal operation (G) and in stand-by (F). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories. "Dolby", "Pro Logic" and the "double-D symbol", are trademarks of Dolby Laboratories.

2.4.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
 - To reach a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to

avoid mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

2.4.4 Alternative BOM identification

In September 2003, Philips CE introduced a change in the way the serial number (or production number, see Figure 2-2) is composed. From this date on, the **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative BOM (Bill of Materials used for producing the specific model of TV set). It is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different O.E.M.s.

By looking at the third digit of the serial number, the service technician can see if there is more than one type of B.O.M. used in the production of the TV set he is working with. He can then consult the At Your Service Web site, where he can type in the Commercial Type Version Number of the TV set (e.g. 28PW9515/12), after which a screen will appear that gives information about the number of alternative B.O.M.s used. If the third digit of the serial number contains the number 1 (example: AG1B0335000001), then there is only one B.O.M. version of the TV set on the market. If the third digit is a 2 (example: AG2B0335000001), then there are two different B.O.M.s. Information about this is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26 = 35 different B.O.M.s can be indicated by the third digit of the serial number.

2.4.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:

<http://www.philips.com/support>

<http://www.p4c.philips.com>

4. Mechanical Instructions

Index of this chapter:

- 4.1 Set Disassembly
- 4.2 Assembly / Board Removal
- 4.3 Set Re-assembly

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

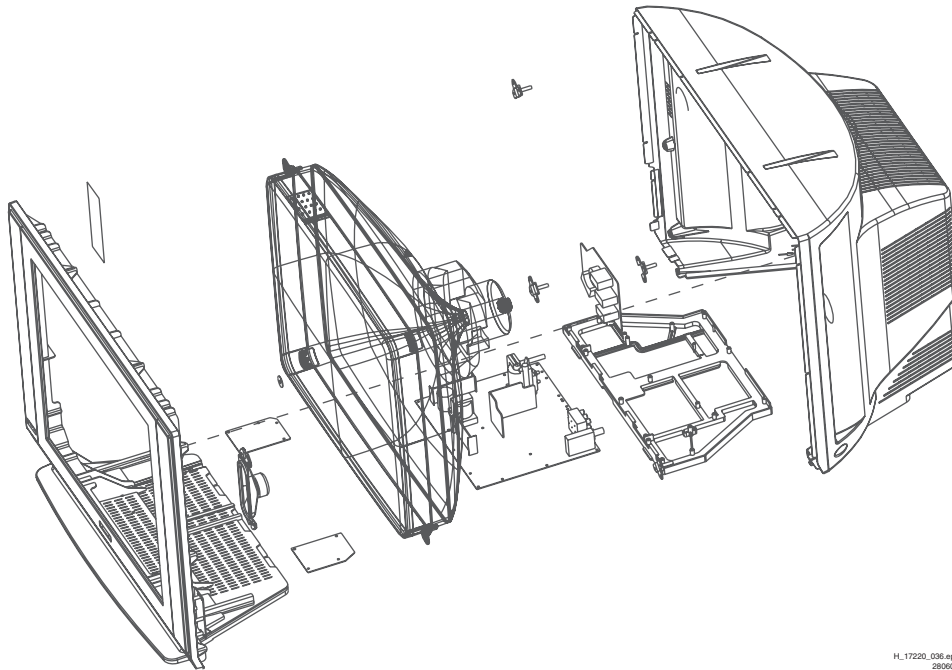
4.1 Set Disassembly

Follow the disassemble instructions in described order.

4.1.1 Rear Cover Removal

Warning: disconnect the mains power cord before you remove the rear cover.

1. Remove all the fixation screws of the rear cover.
2. Now, pull the rear cover backwards and remove it.



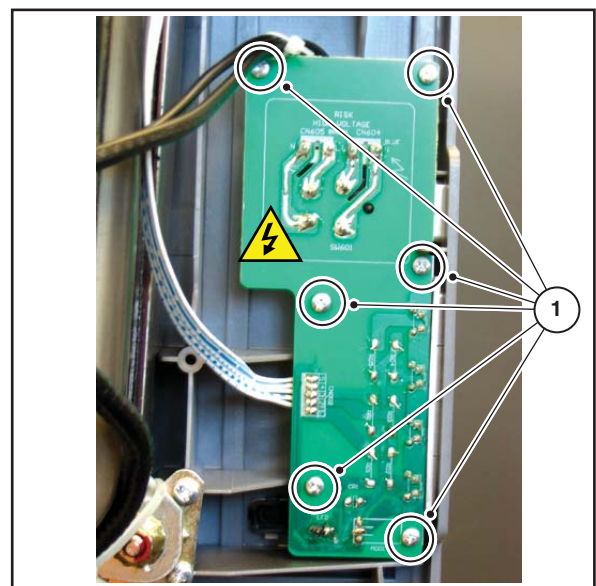
H_17220_036.eps
290607

Figure 4-1 Rear Cover removal

4.2 Assembly / Board Removal

4.2.1 Power Switch and Control Panel removal

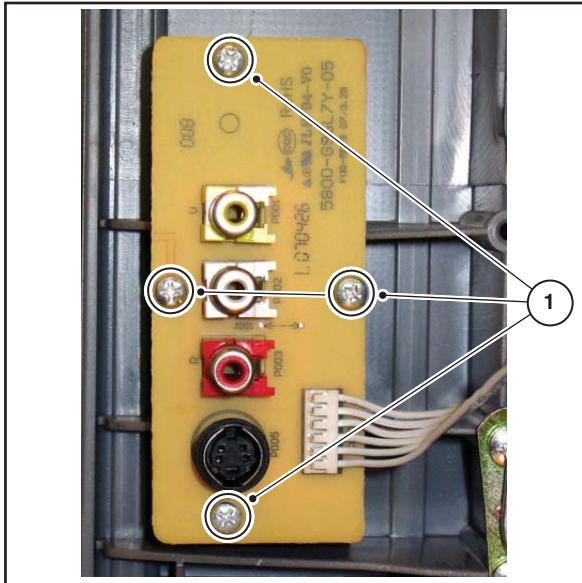
1. From the mono carrier disconnect the main power and the keyboard circuit cables. Release the main power cord and the keyboard circuit cable from it's strain reliefs.
2. Then, remove the six fixation screws [1] of the power switch and control panel and remove the board.



H_17230_027.eps
290607

Figure 4-2 Power Switch and Control Panel removal

4.2.2 Side I/O Panel removal



H_17220_023.eps
210607

Figure 4-3 Side-I/O panel removal

1. Disconnect the side panel cable from the mono carrier and remove the cable from its strain reliefs.
2. Then, remove the four fixation screws [1] and remove the board.

4.3 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.

Be sure that, before the rear cover is mounted:

- The mains cord is positioned correctly in its guiding brackets (make sure that the strain reliefs are replaced in its correct position and that it will function correctly!).
- All wires/cables are returned in their original positions.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- 5.1 Test Points
- 5.2 Service Modes
- 5.3 Error Codes
- 5.4 Fault Finding

5.1 Test Points

See chapter 6 "Block Diagrams, Testpoint Overviews, and Waveforms".

Perform measurements under the following conditions:

- Service Default Mode.
- Video: colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

This chassis does not contain a specific Service Mode. Service and Alignment of the TV set can be done via the Factory Mode by the service technician, see further down in this manual.

5.3 Error Codes

Not applicable.

5.4 Fault Finding

5.4.1 Power on Failure

Check whether the power supply is working properly and whether the values of voltages normal. If those are correct, check line transistor and transformer are working properly or check fore or back line for defects.

5.4.2 Horizontal Deflection Transistor Defective: No Picture, No Sound.

To find the fault for a defect horizontal deflection transistor please check the following items:

- Over voltage to breakdown.
- Over current to burn.
- Horizontal frequency too low.
- Horizontal drive inefficient.

5.4.3 Picture Interference

- Check if the signal line contact is good.
- Change Tuner if is necessary.

5.4.4 Can't find any TV program

Checking method: Check the closed circuit from tuner to picture decoder IC to detect whether there are defective components. Or check whether the resistance of R117, R118, R203 and R204 has increased which also could cause the problem.

5.4.5 No Good Picture or Double Image

Check the correctness of the signal from IF1/IF2 to Q101 and relevant circuit. In this case the problem can be Q101 and/or SAW101.

5.4.6 Picture not or incorrect Coloured

- Check the circuit from IC201 to R.G.B. three gun circuit.
- Check the IC soldering and relevant circuitry on physical damage or check for defective capacitors.

5.4.7 Picture with Horizontal Bright Line and Sound

Check both supply voltages of vertical IC301 and relevant circuitry on correctness. Also check the vertical synchronizing signal from IC201.

5.4.8 Remote Control Malfunction

Check the voltage on pin 64 of IC201. The normal value should be 5.15 V. If this is correct check front control panels soldering connections. If can't be solved, check the remote control, crystal or transmitting diode of the remote control are in good condition.

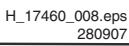
5.4.9 No Sound

Check power supply of sound IC (IC402) and relevant circuitry. Check as well the BTSC board, check the power supply of IC801 and relevant output signal pins 21 and 27 of this IC. Do not exclude IC801 and/or IC402 to be defective. If needed replace the speakers.

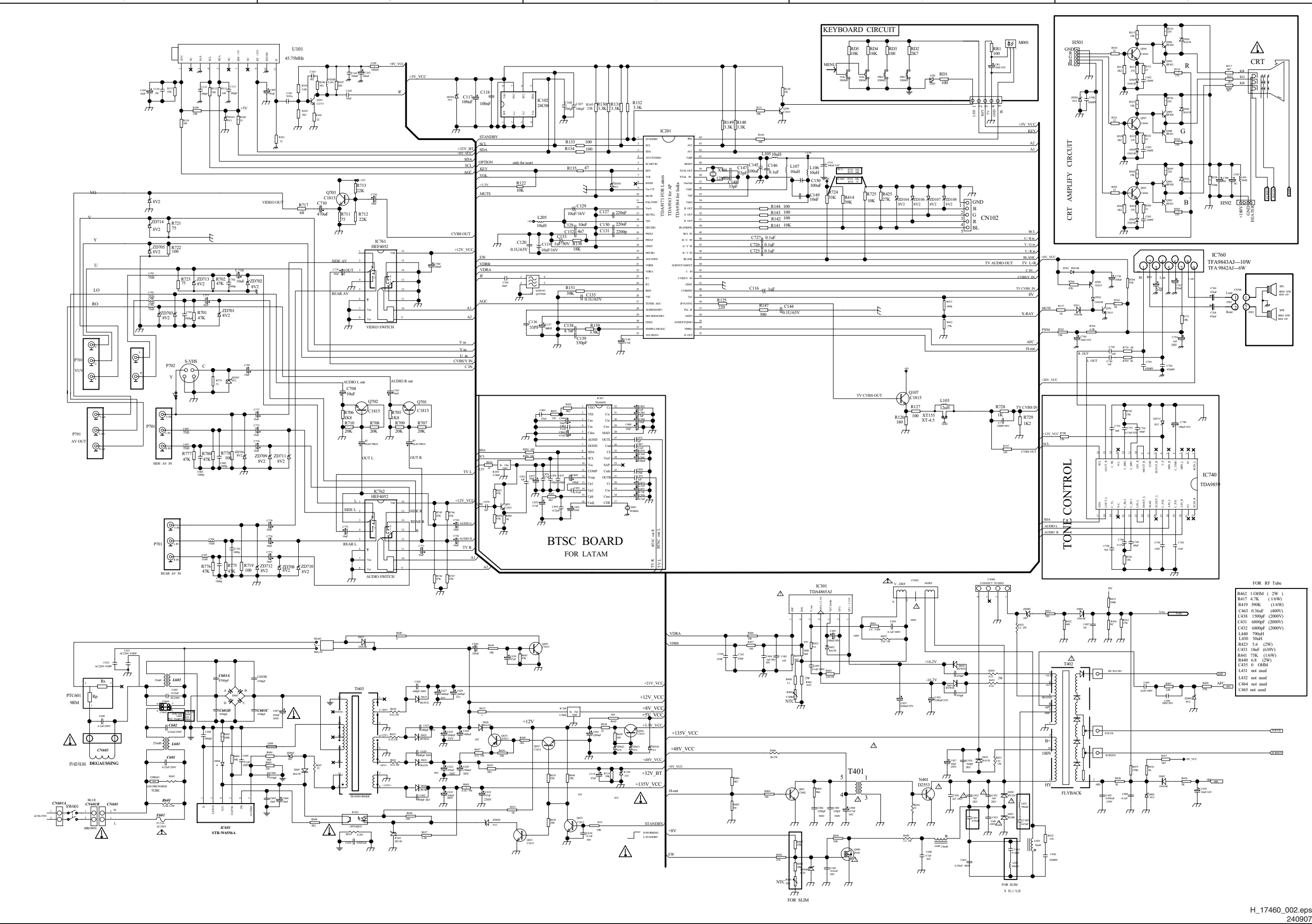
5.4.10 Poor Sound Quality

Check the sound system after searching the channel which should set at NTSC or AUTO. If still has problem, check accompany board circuit on chassis good or not.

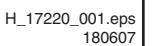
Block Diagram Chassis



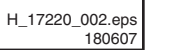
Schematic Overview Chassis



Mono Carrier: Power Supply



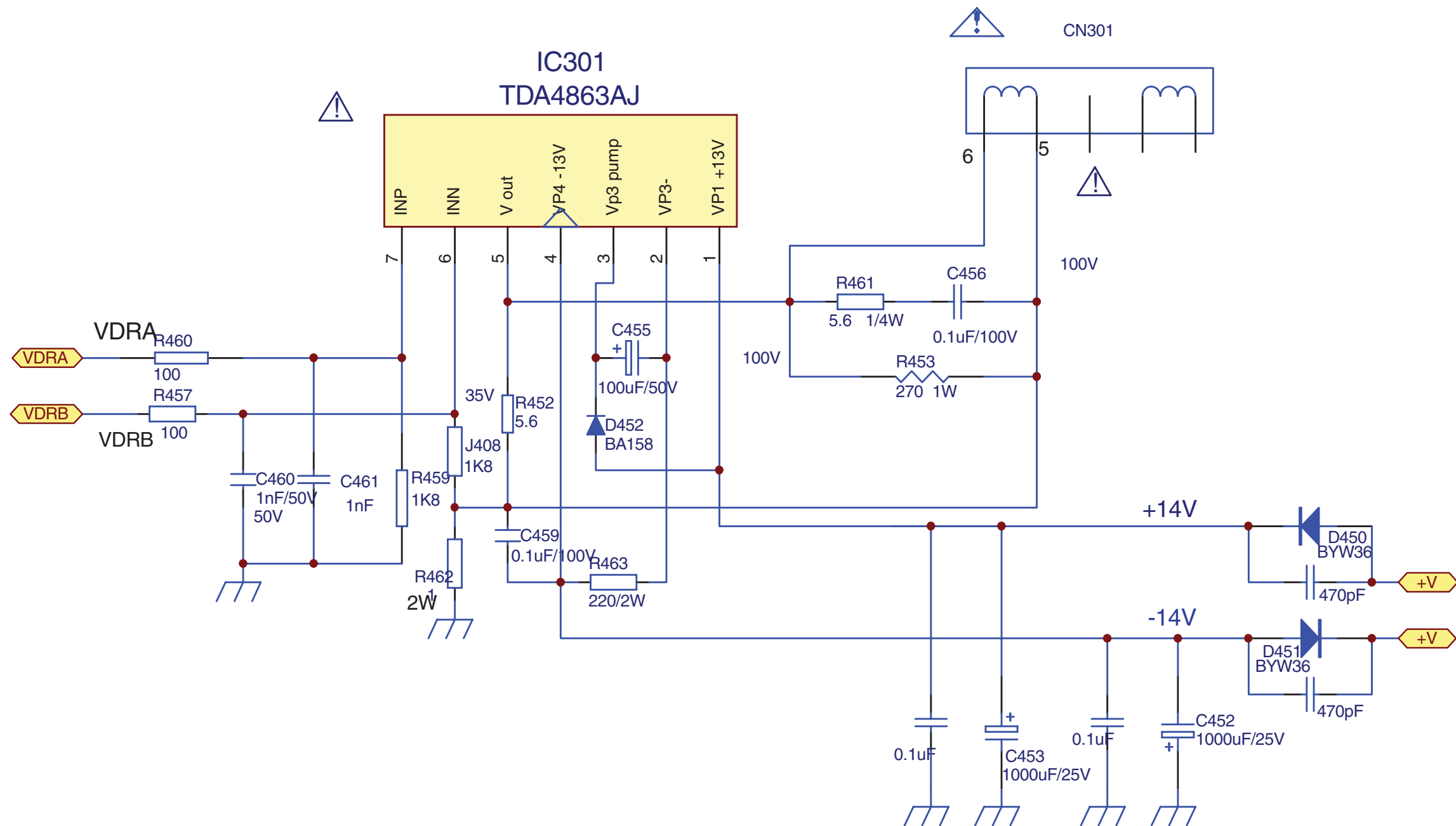
A2 LINE DEFLECTION



Mono Carrier: Frame Deflection

A3 FRAME DEFLECTION

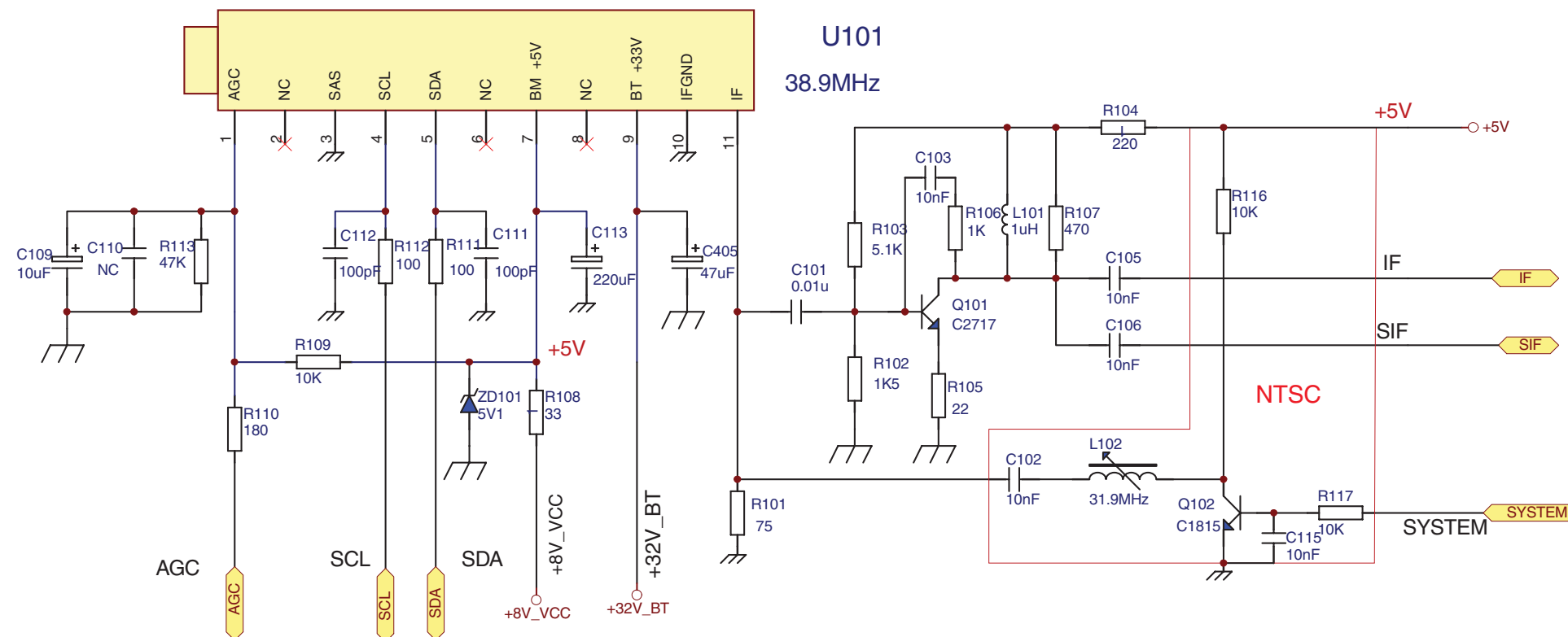
A3



Mono Carrier: Tuner IF

A4 TUNER IF

A4



A5



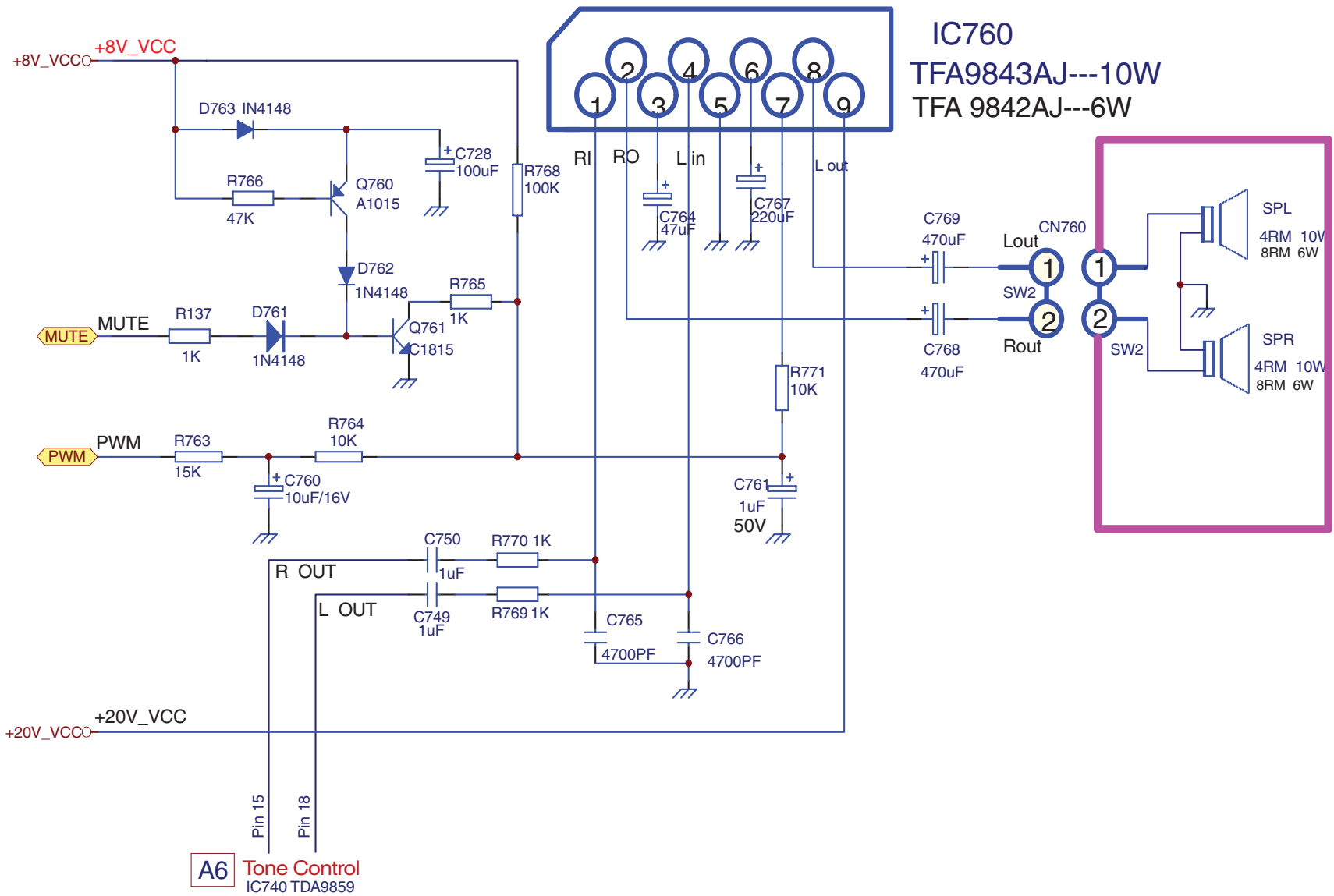
A6 TONE CONTROL



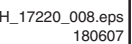
Mono Carrier: Audio Amplifier

A7 AUDIO AMPLIFIER

A7



A8 CPU & DECODER

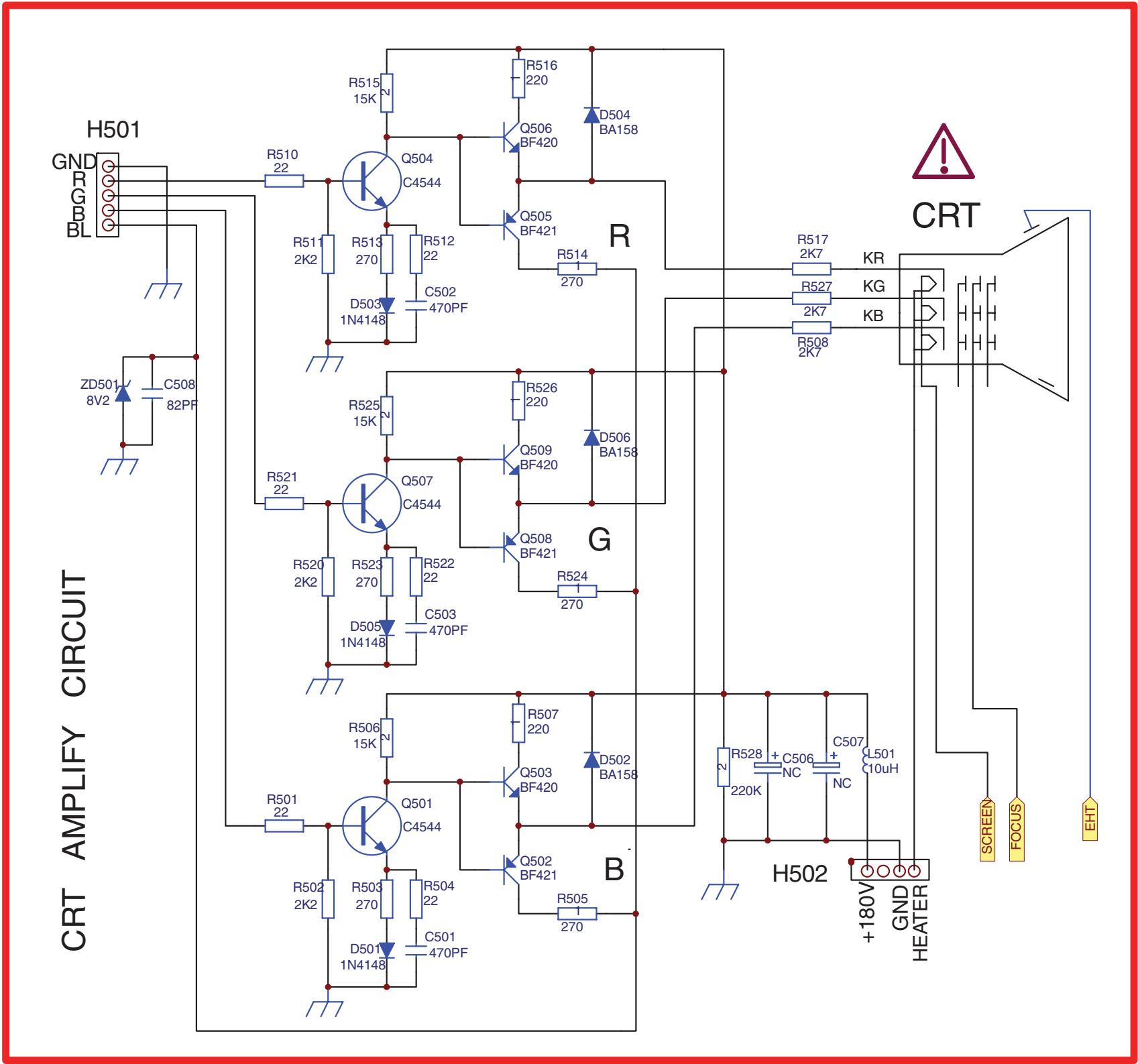


[illegible]

CRT Board

B CRT BOARD

B



Keyboard Control Panel

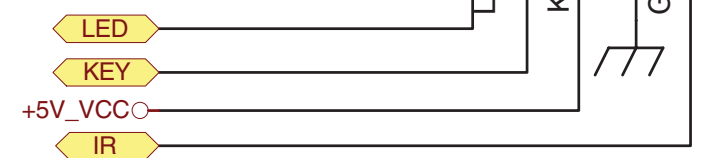
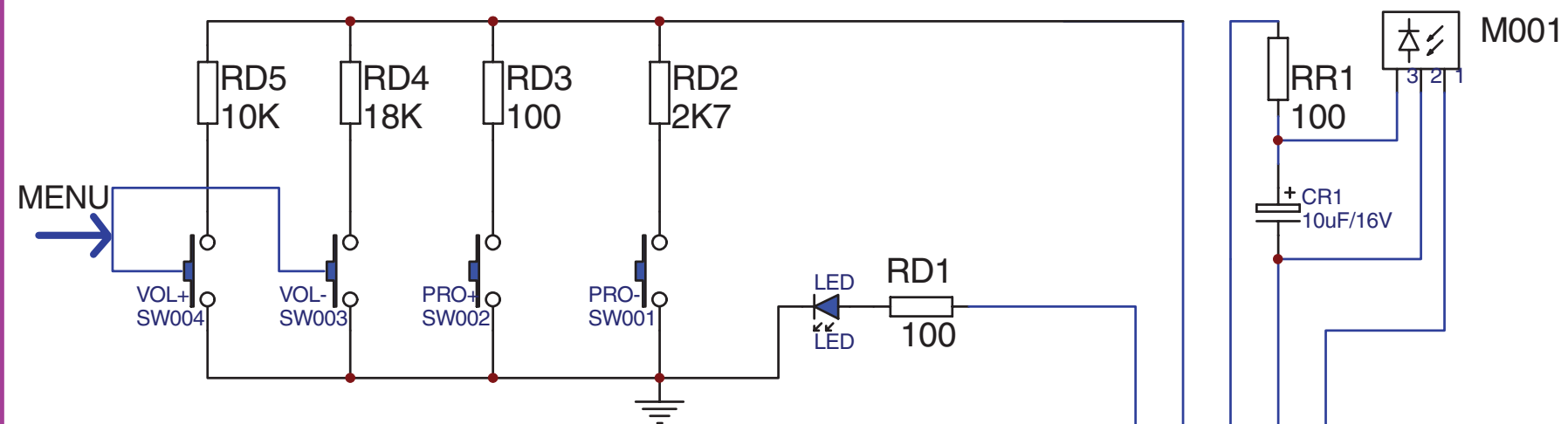
D

KEY CONTROL

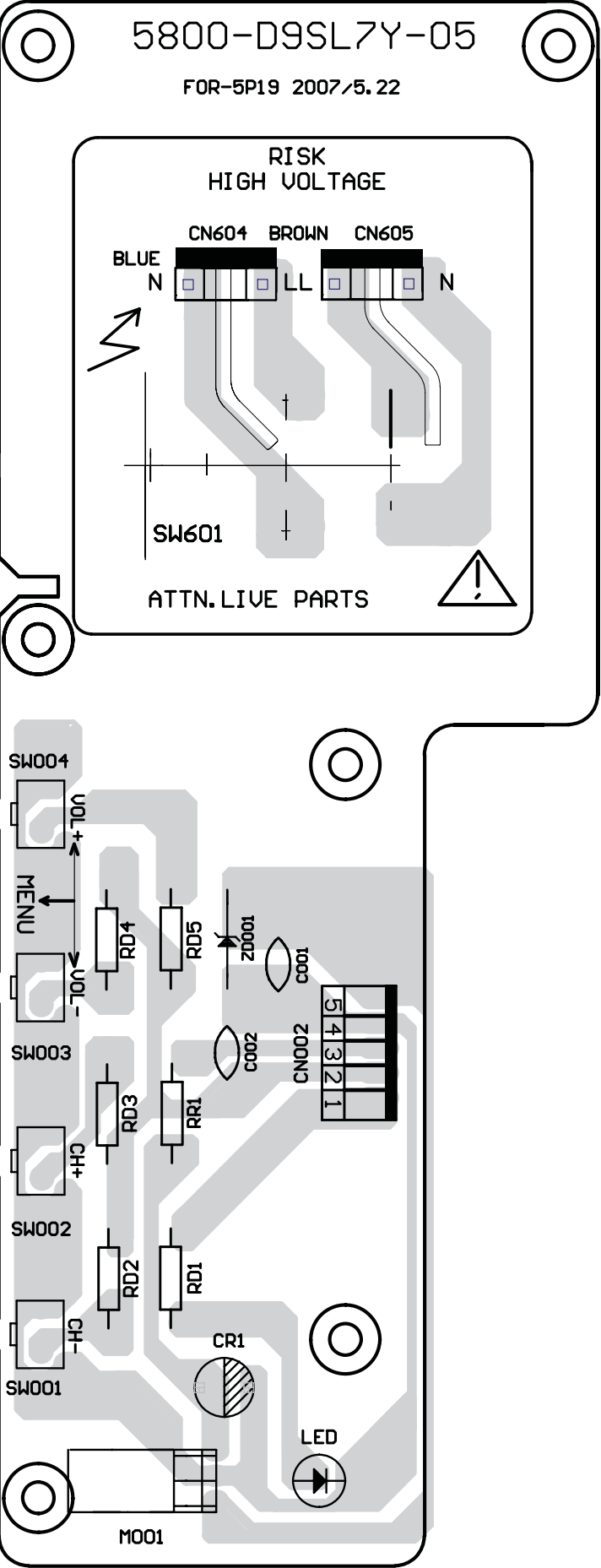
D

KEYBOARD CIRCUIT

KEYBOARD CIRCUIT



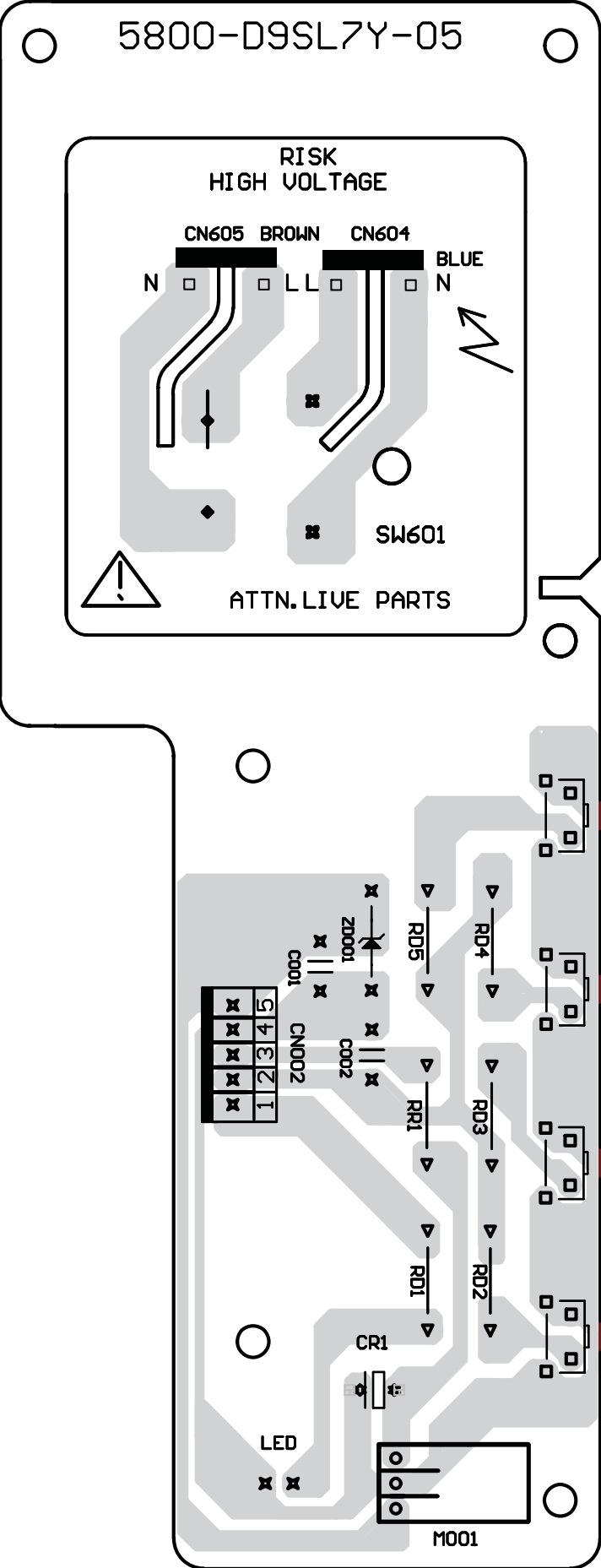
Layout Keyboard Control Panel (Top Side)



5800-D9SL7Y-05

H_17220_015.eps
190607

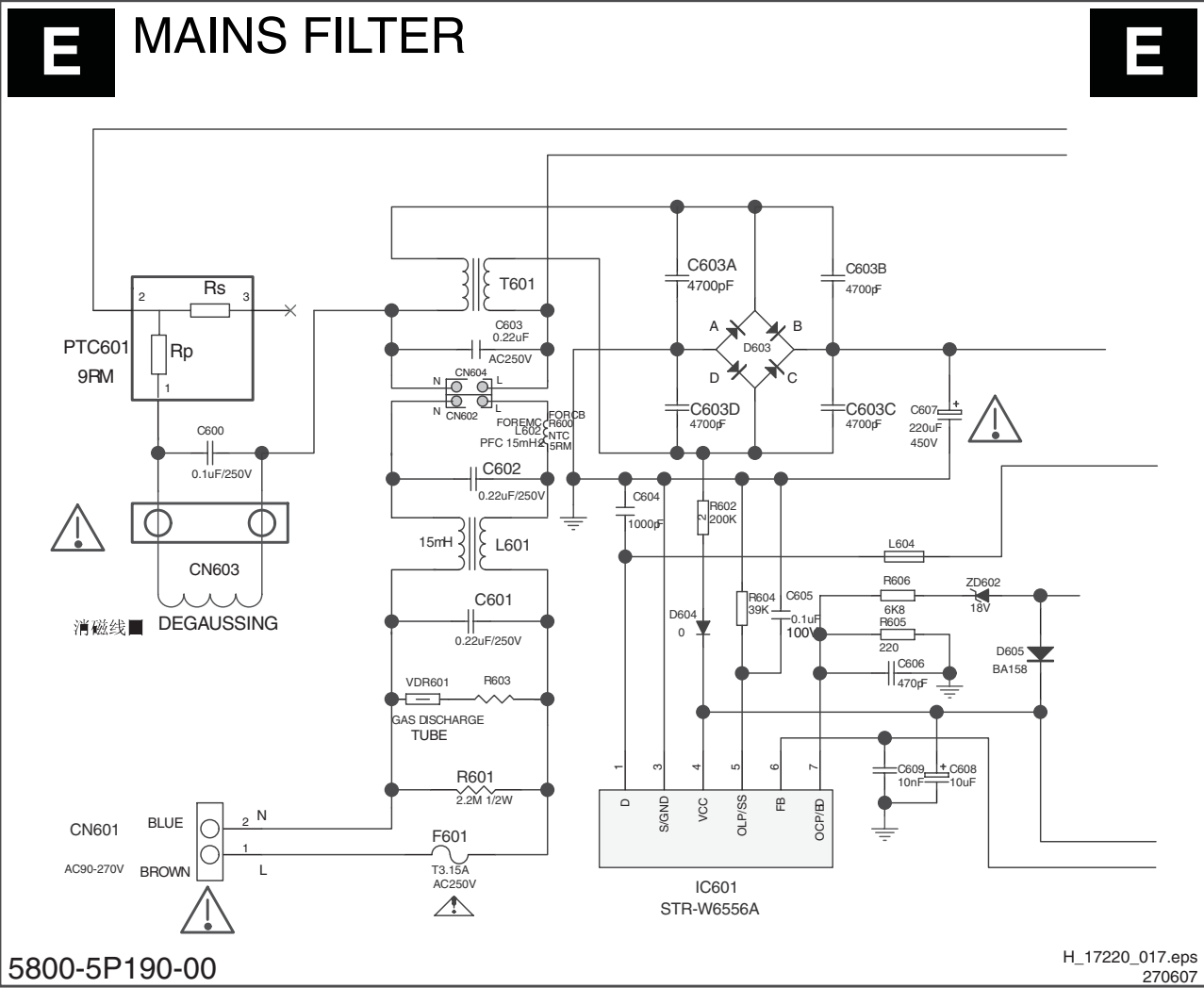
Layout Keyboard Control Panel (Bottom Side)



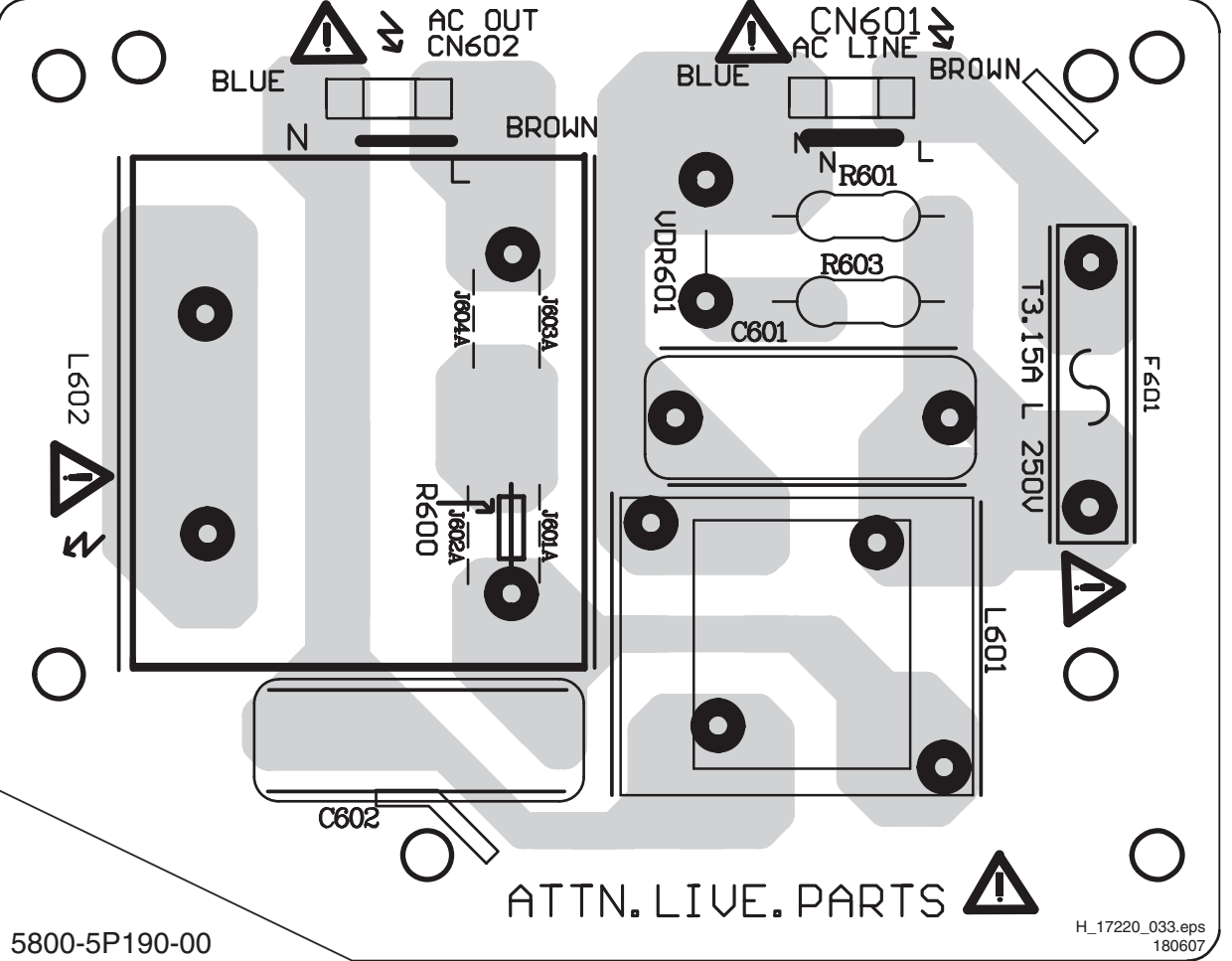
5800-D9SL7Y-05

H_17220_038.eps
290607

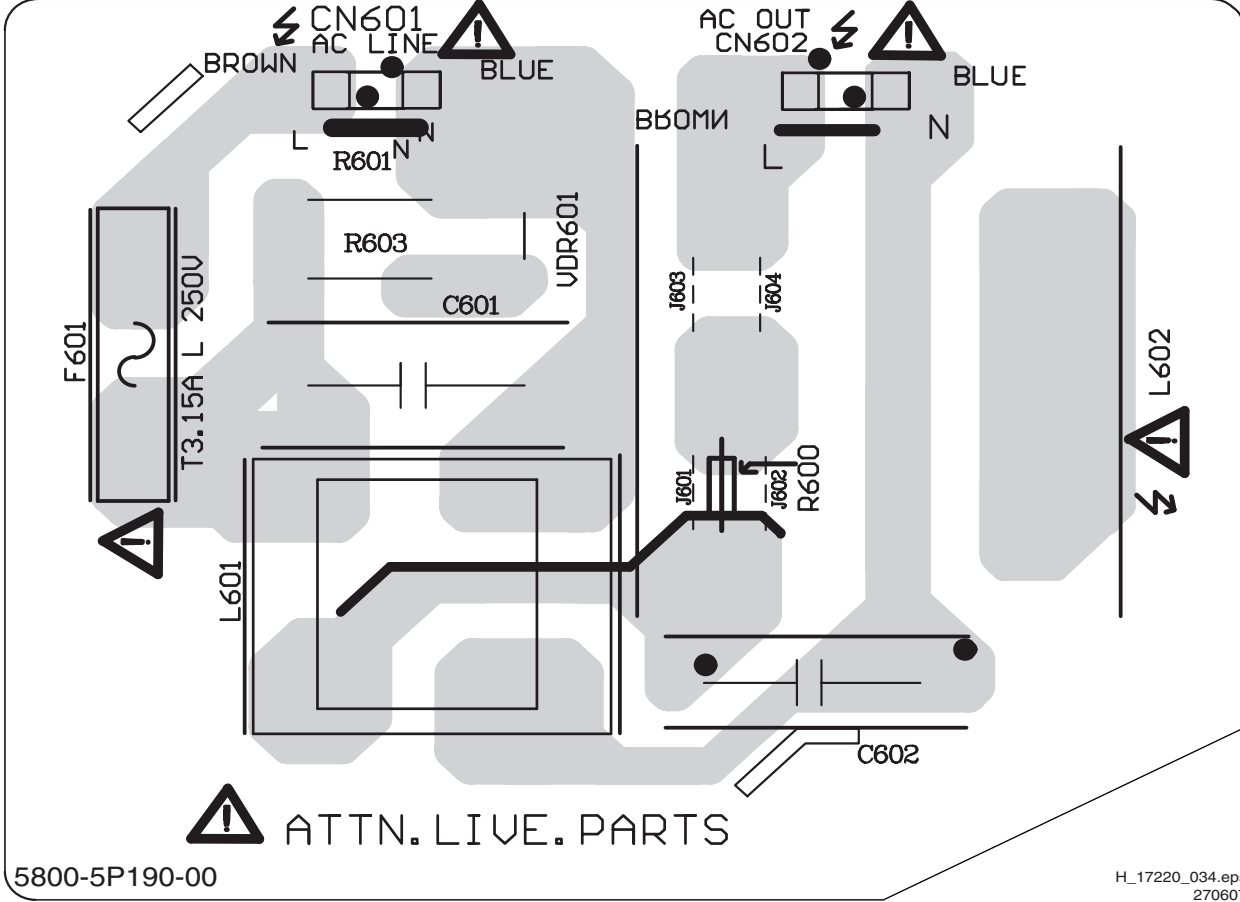
Mains Filter Panel



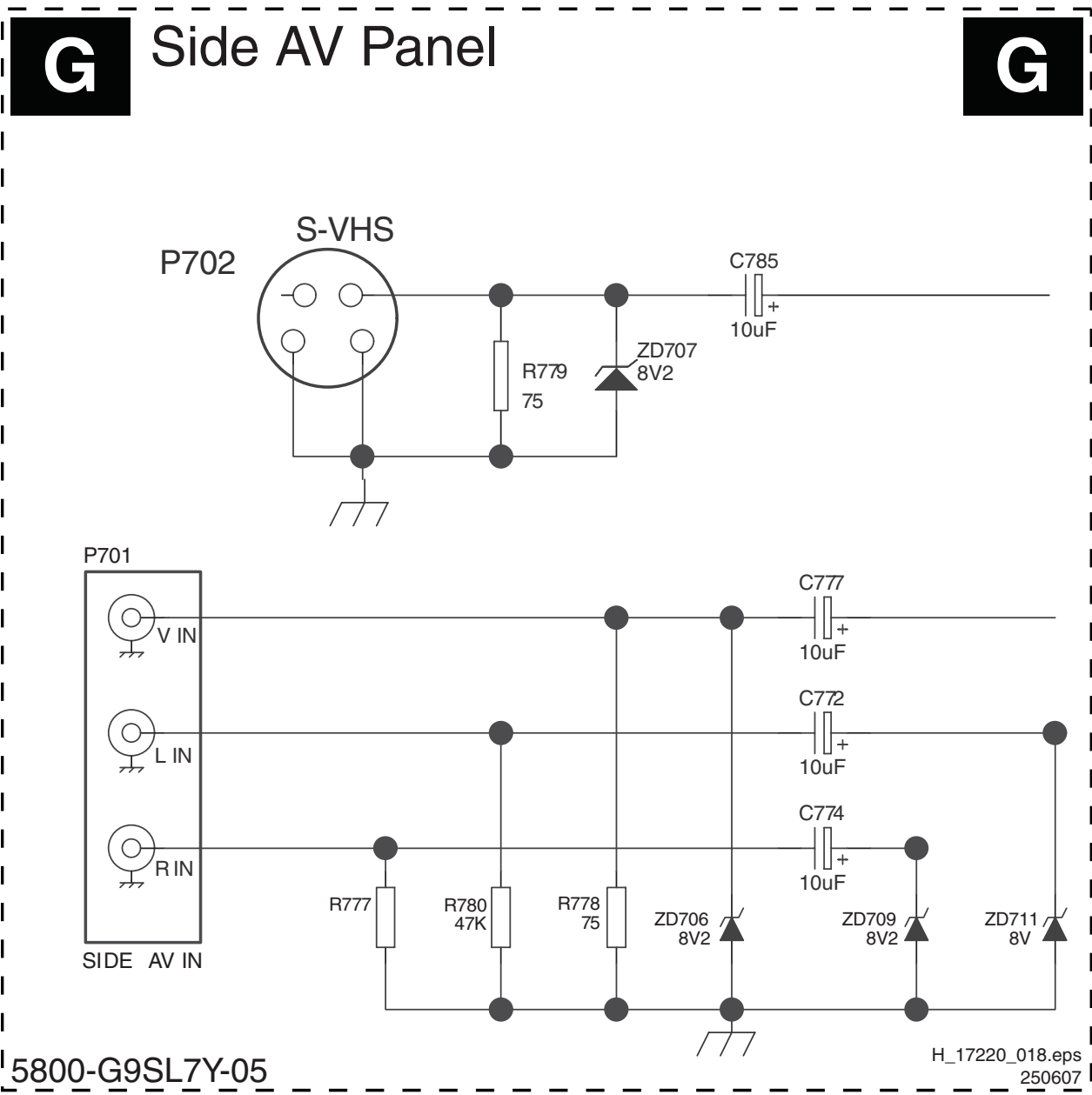
Layout Mains Filter (Top Side)



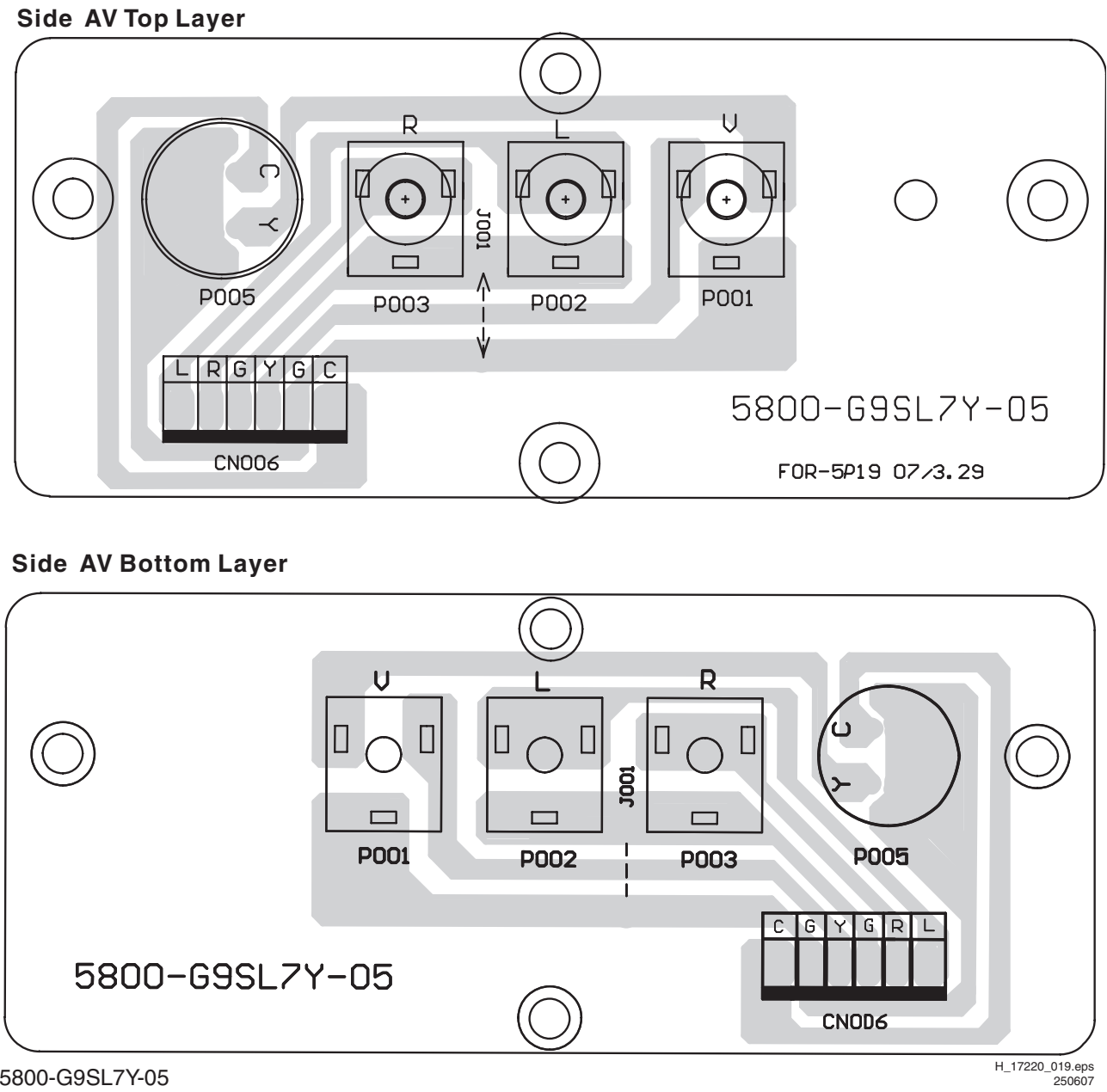
Layout Mains Filter (Bottom Side)



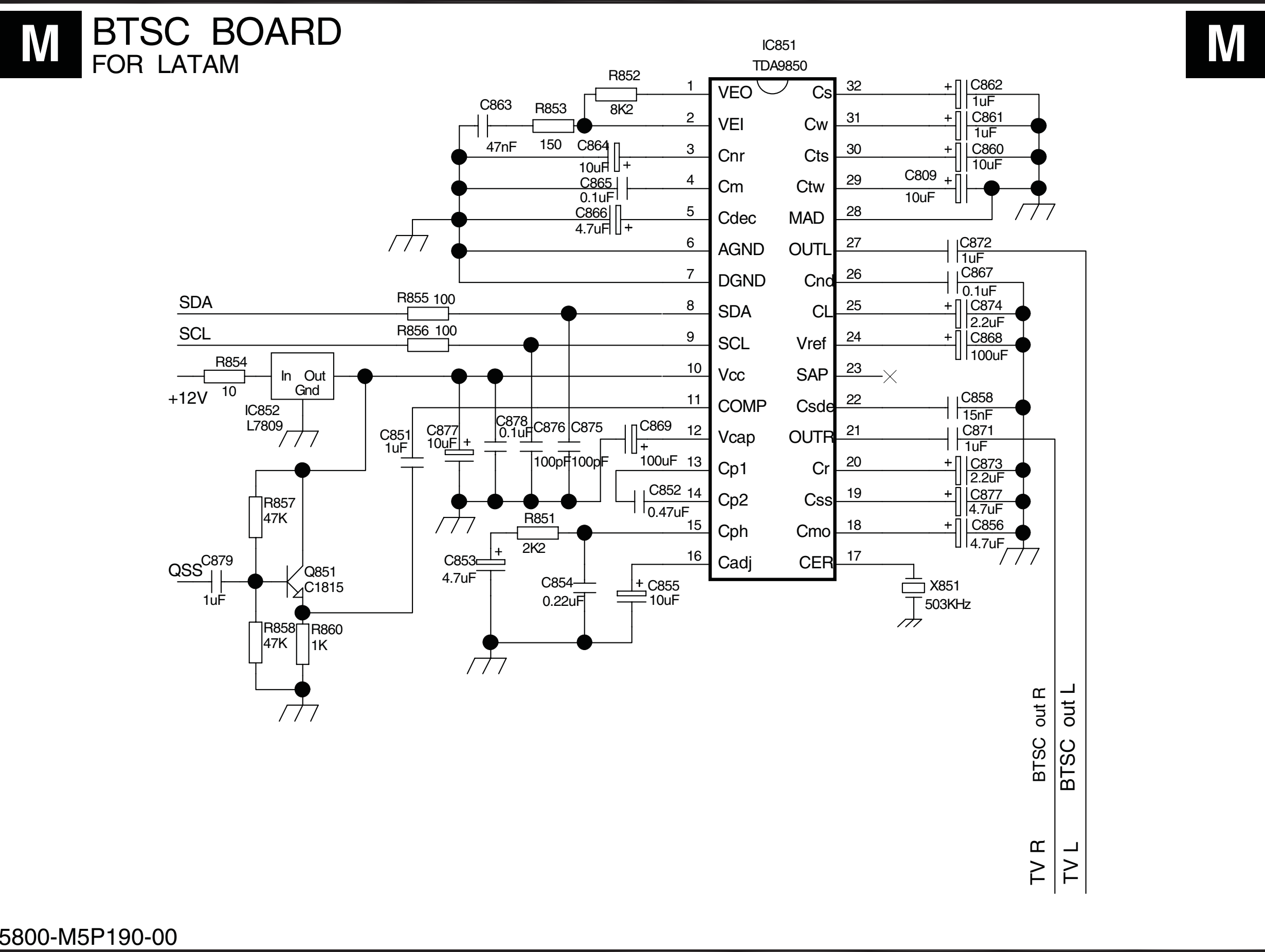
Side A/V Panel



Layout Side A/V Panel



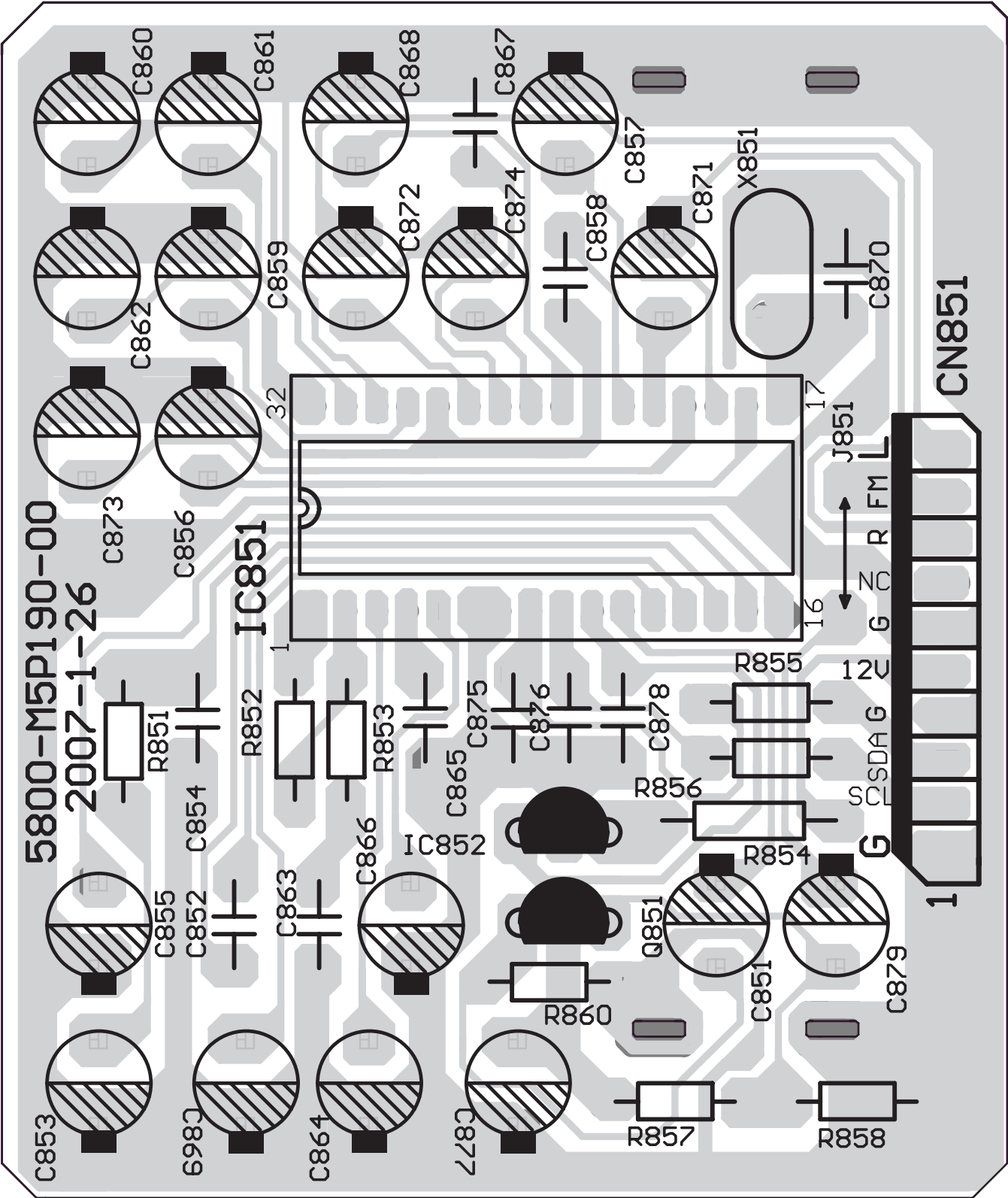
BTSC Panel



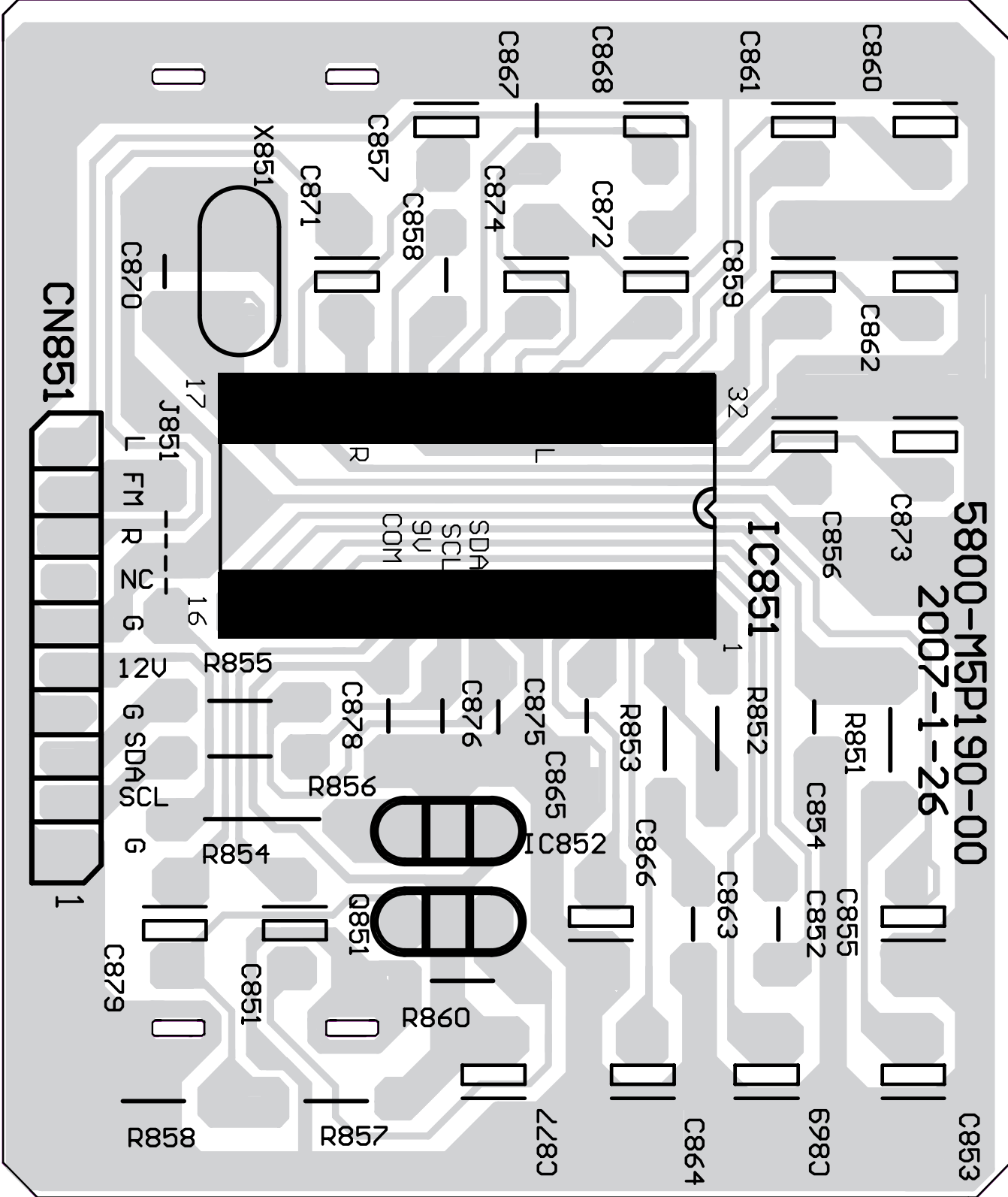
5800-M5P190-00

H_17460_003.eps
240907

Layout BTSC Panel (Top Side)



Layout BTSC Panel (Bottom Side)



This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

8. Alignments

Index of this chapter:

- 8.1 General Alignment Conditions
- 8.2 Hardware Alignments
- 8.3 Software Alignments
- 8.4 Factory mode Settings

8.1 General Alignment Conditions

8.1.1 Default Alignment Settings

Perform all electrical adjustments under the following conditions:

- Power supply voltage: 230 V_{AC} / 50 Hz (± 10%).
 - Connect the set to the mains via an isolation transformer with low internal resistance.
 - Allow the set to warm up for approximately 20 to 30 minutes.
 - Measure voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply).
- Caution:** never use heatsinks as ground.
- Test probe: 100: 1, R_i > 10 Mohm, C_i < 3.5 pF.
 - Use an isolated trimmer/screwdriver to perform alignments.

8.2 Hardware Alignments

For this TV set there are no hardware alignments.

8.3 Software Alignments

Put the set in its MENU mode (factory mode) as follows (see also figure "Factory Mode" on the next page):

- Press the keys [i+], "smart sound" and "smart picture" to enter the factory menu.
- Press the keys [i+] again and "ADJUST" appear on screen.
- Press the number keys to enter the adjust page, press \overline{B} / \overline{y} to choose the items that to be adjusted, Press \overline{z} / \overline{A} to adjust its value.
- Press [i+] to quit factory mode.

The different alignment parameters are described further on.

8.3.1 Rf AGC Voltage Adjust

1. Provide a 294.25 MHz, 60 dB half colour bar signal.
2. Enter factory mode and press key 1.
3. Measure tuner AGC point voltage, adjust AGC item till the voltage is 2.2 V, or till picture noise just disappears. (typical value is at 32).

8.3.2 Focus Fine Adjust

1. Provide a cross-hatch pattern signal.
2. Set state to "Rich" mode.
3. Adjust flyback transformers Focus knob till picture is clear.

8.3.3 Screen Voltage Adjust

1. Set picture to "Standard" mode, without signal input.
2. Press the keys [i+], "Smart sound" and "Smart picture" to enter the factory menu. When in "B/W BALANCE" page, press "mute" on the RC. There will be a level light line displays.
3. Adjust flyback transformers Screen knob till the level bright line just can be seen.
4. When in the light-line screen, CUT R and CUT G can be adjusted if needed with the following RC key mapping:
To increase /decrease CUT R (See table 8-1)
To increase /decrease CUT G (See table 8-2)
5. Press "MUTE" key to return to the "B/W BALANCE" page.

Table 8-1 To increase /decrease CUT R

Function	CUT R+	CUT R-
RC key	1	4

Table 8-2 To increase /decrease CUT G

Function	CUT G+	CUT G-
RC key	2	5

8.3.4 Horizontal Adjustment (Key 1)

1. Provide a 50 Hz monoscope pattern.
 - Press the keys [i+], "Smart sound" and "Smart picture" to enter the factory menu.
 - Press the keys [i+] again and "ADJUST" appear on screen.
2. Press key "0" and adjust "HPH" to set picture horizontal centre to CRT horizontal centre.

8.3.5 Vertical & YUV/RGB Horizontal Adjust (Key 2)

1. Provide a 50 Hz cross hatch signal, set TV to standard mode. Adjust VSL so that half picture of the pane cross appears. The picture's vertical line is just at the bottom of the half picture. Adjust VSL to make the centre of the picture's vertical line and the kinescope are in superposition.
2. Adjust VSI to obtain picture's vertical re-display ratio more than 90%.
3. Provide a 60 Hz cross hatch signal, do step 1 and 2 again to adjust.
4. If necessary, fine adjust above items.

8.3.6 OSD Position (Key 4)

1. Menu OSD position adjustment: Provide a 50/60 Hz cross hatch pattern. Put the set in MENU mode.
 - Press the keys [i+], "Smart sound" and "Smart picture" to enter the factory menu.
 - Press the keys [i+] again and "ADJUST" appears on screen.
2. Press key 4 to enter the factory mode. Adjust VP and HP item, to obtain menu OSD at the centre of CRT screen.
3. Provide a RGB or YUV cross hatch signal, set the TV in the standard mode, adjust "YUV OSD HS" till picture horizontal centre is at the CRT centre (optional).

Enter Factory Mode:

Press sequentially: I⁺ --> Smart Sound --> Smart Picture
Main Menu in red box.

Navigation:

Navigate parameters in "Main Page" : From the first menu, use the arrow Up or Down to navigate to different pages.

Navigate to individual Service page:

Selecting the number "0 - 8", "Smart Picture" and "Smart Sound" on the remote control to go directly to the pages.

Changing value

Move to the intended parameter with the arrow "up" and "down" key on the RC.

Use the arrow "Right" and "Left" to increase and decrease the value respectively.

Exit

Enter "I⁺" on the RC to exit factory mode.

Main Page**B/W BALANCE**

DRI R	32
DRI G	26
DRI B	39
CUT R	35
CUT G	35
BT	34
CT	35
COOL DR	+ 6
COOL DG	+ 6
COOL DB	+11
COOL CR	+1
COOL CG	+ 0
WARM DR	+7
WARM DG	+2
WARM DB	-4
WARM CR	-4
WARM CG	+3

"I⁺"

ADJUST**SERVICE 0**

FREQUENCY	60HZ
H PH	36-TV
V SL	35
V SH	29
V SI	51
V SC	27
EW WIDTH	34
EW PARA	59
UP CORNER	33
LO CORNER	31
H-PARA	38
H-BOW	35
EW TRAPE	25
ZOOM	44

"0"

SERVICE 1

SHIPMODE	>
AGC	32
AGC SPEED	1
IF	45.75M
HRC&IRC	0FF
MULTI SYSTEM	0FF
PWL	15
XDT	1
XDT Count	30
MVS	USA
MAT	ON
BPB	1
CORING	3
OSO	0FF

"1"

SERVICE 2

UOC VOL SW	0FF
UOC/PWL VOL	40
MONO GAIN	52
STEREO GAIN	52
SAP GAIN	53
AV gain	48
59859 INPUT	0
VOL 10	45
VOL 25	55
VOL 50	80
VPL 80	90
VOL 100	100
FMWS	0
AVL OPT	0FF

"2"

SERVICE 3

AV OPT	0
AV CFG	3
2 AV	0FF
YC/DVD	0FF
VIDEO OUT	CVBS
PIN 5	NTSC
PIN 7	VOL1
PIN 8	MUTE
MUTE PIN	0FF
CC HP	13
CC LINE	21
CC DELAY	12
HCO	ON
OSVE	0FF

"3"

SERVICE 4

VP	53
HP	40
YUV OSD HS	44
OSD L	0
HALFTONE	ON
SYBER-SKY2-070810	

"4"

SERVICE 5

BTSC-MODE	Stereo
BTSC-ST	0
BTSC-SP	0
BTSC-LI	9
BTSC-A1	15
BTSC-A2	19
BTSC-TC	4
BTSC-STS	ON
BTSC-ADJ	Start
MTS DETECT	50
MTS FILTER	20
W: 00 00 40 09 0F 93 04	
R: 0F 13	
D: MONO ST SAP	

"5"

SERVICE 6

POW	2
POWER ON TIM	12
AKB	ON
NBL	ON
WATCHDOG	ON
PHILIPS RC	ON
VCHIP	0FF
GAME	0FF
CALENDAR	0FF
ZOOM OPT	ON
BLUE BACK	ON
BB WIDTH	+1
BLACK BACK	0FF
STB	0FF

"6"

SERVICE 7

SUB BRI	3
SUB CON	2
SUB COL	30
SUB SHA	32
SUB TI	12
YDL PAL	10
YDL NTSC	4
YDL AV	0
CATHE	3
MAX BRI	52
MID BRI	27
MAX CON	63
MID CON	28
SC. BRI	8

"7"

SERVICE 8

YUV DR	+0
YUV DG	+2
YUV DB	+0
YUV CR	+0
YUV CG	+0
ENGLISH	ON
SPANISH	ON
FRANCH	0FF
PORTUGUESE	ON

"8"

"Smart Picture"

Soft	
BRIGHT	50
CONTRAST	70
COLOR	50
SHARP	70
YUV SHARP	70
COLOR TEMP	WARM

"Smart Picture"

Rich	
BRIGHT	55
CONTRAST	100
COLOR	55
SHARP	90
YUV SHARP	90
COLOR TEMP	COOL

"Smart Picture"

Natural	
BRIGHT	55
CONTRAST	80
COLOR	50
SHARP	80
YUV SHARP	80
COLOR TEMP	NORMAL

"Smart Picture"**"Smart Sound"**

Voice	
BASS	30
TREBLE	50
SURROUND	0FF

"Smart Sound"

Music	
BASS	55
TREBLE	60
SURROUND	0FF

"Smart Sound"

Theatre	
BASS	80
TREBLE	70
SURROUND	ON

"Smart Sound"

Figure 8-1 Software Alignments

8.4 Factory mode Settings

Description of the factory menu	Storage address	Display string	Range (Index value)			Default	SK5.0L CA
B/W balance							
White point R adjustment.	0x00d	DRI R	0-63			32	32
White point G adjustment	0x00e	DRI G	0-63			32	32
White point B adjustment	0x00f	DRI B	0-63			32	32
Black level off-set R adjustment	0x010	CUT R	0-63			32	32
Black level off-set G adjustment.	0x011	CUT G	0-63			32	32
"BRIGHTNESS" of "White Balance Adjustment page" setting	0x02f	BT	0-63			32	32
"CONTRAST" of "White Balance Adjustment page" setting	0x030	CT	0-63			32	32
COOL offset according to "DRI R" value of tv, white point R of "COOL"	0x017	COOL DR	0-63			-2	6
COOL offset according to "DRI G" value of tv, white point G of "COOL"	0x018	COOL DG	0-63			0	6
COOL offset according to "DRI B" value of tv, white point B of "COOL"	0x019	COOL DB	0-63			10	13
COOL offset according to "CUT R" value of tv, black level off-set R of "COOL"	0x01a	COOL CR	0-63			0	0
COOL offset according to "CUT G" value of tv, black level off-set R of "COOL"	0x01b	COOL CG	0-63			0	0
WARM offset according to "DRI R" value of tv, white point R of "COOL"	0x01c	WARM DR	0-63			10	7
Warm offset according to "DRI G" value of tv, white point G of "COOL"	0x01d	WARM DG	0-63			0	0
Warm offset according to "DRI B" value of tv, white point B of "COOL"	0x01e	WARM DB	0-63			0	-6
Warm offset according to "CUT R" value of tv, black level off-set R of "COOL"	0x01f	WARM CR	0-63			0	0
Warm offset according to "CUT G" value of tv, black level off-set R of "COOL"	0x020	WARM CG	0-63			0	0
Direct key "0"							
50hz/60hz		Frequency	60 Hz				
Horizontal center	0x008	H PH	0-TV-63-TV			31-TV	33-TV
Vertical slope	0x009	V SL	0-63			24	40
Vertical center	0x00a	V SH	0-63			21	28
Vertical amplitude.	0x00b	V SI	0-63			33	51
Vertical s-correction.	0x00c	V SC	0-63			27	27
EW WIDTH	0x04b	EW WIDTH	0-63			32	45
EW parabola/width	0x04c	EW PARA	0-63			32	49
EW upper/lower corner parabola	0x04d	UP CORNER	0-63			32	28
Bottom curve	0x04e	LO CORNER	0-63			32	34
Horizontal parallelogram	0x04f	H-PARA	0-63			32	35
Horizontal bow	0x050	H-BOW	0-63			32	39
EW trapezium	0x051	EW TRAPE	0-63			32	21
Expand 4:3 mode horizontal WIDTH adjust	0x0ed(bit4)	ZOOM	0-63			44	44
50hz/60hz		Frequency	50 Hz				
Horizontal center	0x003	H PH	0-TV-63-TV			31-TV	31-TV
Vertical slope	0x004	V SL	0-63			24	40
Vertical center	0x006	V SH	0-63			21	28
Vertical amplitude.	0x005	V SI	0-63			33	52
Vertical s-correction.	0x007	V SC	0-63			27	27
EW WIDTH	0x044	EW WIDTH	0-63			32	45
EW parabola/width	0x045	EW PARA	0-63			32	48
EW upper/lower corner parabola	0x046	UP CORNER	0-63			32	32
Bottom curve	0x047	LO CORNER	0-63			32	32
Horizontal parallelogram	0x048	H-PARA	0-63			32	35
Horizontal bow	0x049	H-BOW	0-63			32	32
EW trapezium	0x04a	EW TRAPE	0-63			32	26
Expand 4:3 mode horizontal WIDTH adjust	0x062	ZOOM	0-63			44	44
Horizontal center in AV source.	0x05e	H PH	+5-AV			32	32
Horizontal center in AV source.	0x05f	H PH	+5-AV			32	32
Horizontal center in YUV source.	0x05c	H PH	+0-YUV			32	32
Horizontal center in YUV source.	0x05d	H PH	+0-YUV			32	32
Direct key "1"							
Out of box setting, Smart Picture: Rich, Contrast +: On, NR: Off, Smart Sound: Theatre, Tuner Mode: Auto, Volume: 30, CC: Off		SHIPMODE	OFF	ON			
RF.AGC adjust	0x002	AGC	0-63			24	32
AGC speed	0x0de (bit5, bit4)	AGC SPEED	0-63			1	1
IF choose	0x0dd (bit7, bit6)	IF	58.75 Mhz	45.75 Mhz		45.75 Mhz	45.75 Mhz
HRC and IRC of N system for auto search selection	0x0ea (bit4)	HRC & IRC	OFF	ON		OFF	OFF
ON: PAL M/N ON, OFF: PAL M/N OFF	0x0ea (bit1)	MULTI SYSTEM	OFF	ON		ON	ON
White apex limit	0x0cb (bit7-bit4)	PWL	0-15			0	15
X ray protect	0x0e1 (bit2, bit3)	XDT	0-2			1	1
X ray protection detect count	0x073	XDT COUNT	0-255			30	30
NTSC decode matrix	0x0e7(bit2)	MUS	USA	JAP		USA	USA
PAL, NTSC decode matrix	0x0ed (bit0)	MAT	OFF	ON		OFF	ON
Bypass of sound bandpass filter	0x0e1 (bit5, bit4)	BPB	0-2			1	1
Video dependent coring	0x0de (bit3, bit2)	CORING	0-3			3	3
Switch-off in vertical overscan	0x0e7 (bit7)	OSO	OFF	ON		ON	ON
Direct key "2"							
UOC control volume switch	0x0e8 (bit7)	UOC VOL SW	OFF	ON		OFF	OFF
UOC/PWM modify volume value	0x02e	UOC/PWM VOL	0-63			41	40
Volume of 9859 modify value when sound is mono	0x052	MONO GAIN	0-63			48	52

Description of the factory menu	Storage address	Display string	Range (Index value)			Default	SK5.0L CA
Volume of 9859 modify value when sound is stereo	0x053	STEREO GAIN	0-63			48	52
Volume of 9859 modify value when sound is SAP	0x054	SAP GAIN	0-63			48	50
Volume of 9859 modify value when system is AV state	0x055	AV GAIN	0-63			48	48
9859 control pin output state	0x0e0 (bit3, bit2)	9859INPUT	0-2			2	0
10% volume point	0x026	VOL 10	0-100			25	20
25% volume point	0x027	VOL 25	0-100			50	45
50% volume point	0x028	VOL 50	0-100			75	60
80% volume point	0x029	VOL 80	0-100			90	80
100% volume point	0x02a	VOL 100	0-100			100	100
FM demodulate frequency width	0x0de (bit1, bit0)	FMWS	0-2			0	0
AVL function switch	0x0e8 (bit6)	AVL OPT	OFF	ON		OFF	OFF
Direct key "3"							
AV control logic choose	0x0e1 (bit7, bit6)	AV OPT	0-3			1	0
AV choose	0x0cc (bit7-bit4)	AV CFG	0-7			3	3
AV2 choose	0x0ea (bit5)	2 AV	OFF	ON		OFF	OFF
DVD choose	0x0e9 (bit4)	YC/DVD	OFF	ON		OFF	OFF
Video output	0x0e7 (bit4)	VIDEO OUT	IF	CVBS		CVBS	CVBS
Pin 5 choose function	0x0cc (bit3-bit0)	PIN 5				NTSC	NTSC
Pin 7 choose function	0x0cd (bit7-bit4)	PIN 7				VOL1	VOL1
Pin 8 choose function	0x0cd (bit3-bit0)	PIN 8				MUTE	MUTE
MUTE pin mode	0x0e9 (bit0)	MUTEPIN MODE	OFF	ON		OFF	
OFF: Pin 7 control volume curve ON: Pin 4 control volume curve	0x0ee (bit6)	MUTEPIN SEL				OFF	
CCD Horizontal width adjust	0x05a	CC HP	0-15			13	13
CCD scan Horizontal row when PAL N system	0x060	CC LINE	0-60			21	21
CCD delay adjustment	0x0d1 (bit3-bit0)	CC DELAY	8-23			20	12
Direct key "4"							
OSD up down position	0x02b	VP	0-63			52	51
OSD left right position	0x02c	HP	0-63			54	42
RGB/YUV OSD Horizontal Center	0x05b	YUV OSD HS	0-60			38	44
OSD output contrast	0x0df (bit7, bit6)	OSD L	0-3			0	0
Menu translucence	0x0e9 (bit1)	HALFTONE	OFF	ON		ON	ON
Software version number		SOFTWARE VERSION NUMBER					
Direct key "5"							
Sound mode		BTSC-MODE	MONO	STEREO	SAP		
Stereo noise limit	0x0ce (bit7-bit4)	BTSC-ST	0-15			0	0
SAP noise limit	0x0ce(bit3-bit0)	BTSC-SP	0-15			0	0
Sound input level adjustment	0x040	BTSC-LI	0-15			7	9
Separate	0x041	BTSC-A1	0-31			23	14
Separate	0x042	BTSC-A2	0-31			22	6
Time constant	0x0cf (bit7-bit4)	BTSC-TC	0-7			4	3
Stereo level switch	0x0e8 (bit3)	BTSC-STs	OFF	ON		OFF	ON
Stereo adjustment on/off	0x0e8 (bit2)	BTSC-ADJ	BUSY	START		START	START
MTS detect time delay	0x001	MTS DETECT	0-255			50	50
STEREO and SAP detect count	0x072	MTS FILTER	0-255			20	20
MONO detect count	0x074	MTS FILTER2	0-255			20	3
Direct key "6"							
POWER ON MODE	0x0dd (bit3, bit2)	POW	0-2			2	2
POWER ON time delay	0x0cb (bit3-bit0)	POWER ON TIM	2-17			12	12
Black current stabilization	0x0e8 (bit0)	AKB	OFF	ON		ON	ON
Black current loop detect	0x0e9 (bit7)	NBL	OFF	ON		ON	ON
WATCH DOG	0x0eb (bit7)	WATCHDOG	OFF	ON		OFF	ON
ON: Philips RC OFF: Skyworth RC	0x0eb (bit6)	PHILIPS RC	OFF	ON		ON	ON
VCHIP FUNCTION SWITCH	0x0ea (bit7)	VCHIP	OFF	ON		OFF	OFF
GAME FUNCTION SWITCH	0x0eb (bit5)	GAME	OFF	ON		OFF	OFF
CALENDER FUNCTION SWITCH	0x0eb (bit4)	CALENDER	OFF	ON		OFF	OFF
4:3 expand function choose	0x0ec (bit6)	ZOOM OPT	OFF	ON		ON	ON
ON: Blue Screen OFF: Black Screen	0x0e9 (bit6)	BLUE BLACK	OFF	ON		ON	ON
EW WIDTH offset according to "EW WIDTH" value when TV is no signal	0x06d	BB WIDTH	53-10			+0	1
Video mute during change to program	0x0e1 (bit1, bit0)	BLACK BACK	0-2			0	0
RGB BLANKING	0x0ee (bit7)	RGB BLANKING	OFF	ON		ON	ON
Direct key "7"							
Sub contrast	0x057	SUB BRI	0-63			0	3
Sub brightness	0x059	SUB CON	0-63			0	2
Sub color	0x023	SUB COL	0-63			30	30

Description of the factory menu	Storage address	Display string	Range (Index value)			Default	SK5.0L CA
Sub Sharpness	0x024	SUB SHA	0-63			32	32
TV Sub tint	0x025	SUB TIN	0-31			16	16
AV Sub tint	0x075	SUB TIN-AV	0-31			16	16
PAL Luminance delay	0x0c9 (bit3-bit0)	YDL PAL	0-15			2	10
NTSC Luminance delay	0x0c9 (bit7-bit4)	YDL NTSC	0-15			2	10
AV Luminance delay	0x0ca(bit7-bit4)	YDL AV	0-15			4	10
Maximum brightness	0x056	MAX BRI	0-63			63	52
Middle brightness	0x021	MID BRI	0-63			18	27
Maximum contrast	0x058	MAX CON	0-63			63	63
Middle contrast	0x022	MID CON	0-63			15	28
Line-level of brightness	0x02d	SC.BRI	0-63			8	8
Direct key "8"							
YUV offset according to "DRI R" value of TV, white point R of YUV.	0x012	YUV DR	(-32) - (+31)			+0	+0
YUV offset according to "DRI G" value of TV, white point G of YUV	0x013	YUV DG	(-32) - (+31)			+0	+0
YUV offset according to "DRI B" value of TV, white point B of YUV	0x014	YUV DB	(-32) - (+31)			+0	+0
YUV offset according to "CUT R" value of TV, black level offset R of YUV	0x015	YUV CR	(-32) - (+31)			+0	+0
YUV offset according to "CUT G" value of TV, black level offset G of YUV	0x016	YUV CG	(-32) - (+31)			+0	+0
English OSD switch	0x0eb (bit3)	ENGLISH	OFF	ON		ON	ON
Spanish OSD switch	0x0eb (bit2)	SPANISH	OFF	ON		ON	ON
French OSD switch	0x0eb (bit1)	FRANCE	OFF	ON		OFF	OFF
Portuguese OSD switch	0x0eb (bit0)	PORTUGUESE	OFF	ON		ON	ON
External Y (Luminance) input gain during YPRPB. OFF: gain 0 dB reduced, ON: gain 3 dB reduced	0x0ee (bit4)	YGN	OFF	ON		OFF	ON
Cathode drive level	0x0ca (bit3-bit0)	CATHE				3	3
EHT tracking mode	0x0ea (bit6)	HCO				ON	ON
Black current measuring lines in overscan	0x0e9 (bit2)	OSVE				OFF	OFF
Manual INIT E2PROM		INITEEP					
Key "Smart sound"							
BASS set value in Voice state	0x064	BASS				30	30
TREBLE set value in Voice state	0x065	TREBLE				50	50
SURROUND set value in Voice state	0x066	SURROUND				OFF	OFF
BASS set value in Music state	0x067	BASS				55	55
TREBLE set value in Music state	0x068	TREBLE				60	60
SURROUND set value in Music state	0x069	SURROUND				OFF	OFF
BASS set value in Theatre state	0x06a	BASS				80	80
TREBLE set value in Theatre state	0x06b	TREBLE				70	70
SURROUND set value in Theatre state	0x06c	SURROUND				ON	ON
Key "Smart image"							
Bright set value in Soft state	0x036	BRIGHT				55	55
Contrast set value in Soft state	0x037	CONTRAST				50	50
Color set value in Soft state	0x038	COLOR				45	45
Sharpness set value in Soft state	0x039	SHARP				45	45
Sharpness set value in Soft state of YUV	0x070	YUV SHARP				50	50
COLOR TEMP set value in Soft state	0x03a	COLOR TEMP				WARM	WARM
Bright set value in Rich state	0x03b	BRIGHT				70	70
Contrast set value in Rich state	0x03c	CONTRAST				85	85
Color set value in Rich state	0x03d	COLOR				70	70
Sharpness set value in Rich state	0x03e	SHARP				70	70
Sharpness set value in Rich state of YUV	0x071	YUV SHARP				80	80
COLOR TEMP set value in Rich state	0x03f	COLOR TEMP				COOL	COOL
Bright set value in Natural state	0x031	BRIGHT				50	50
Contrast set value in Natural state	0x032	CONTRAST				75	75
Color set value in Natural state	0x033	COLOR				50	50
Sharpness set value in Natural state	0x034	SHARP				50	50
Sharpness set value in Natural state of YUV	0x06f	YUV SHARP				50	50
COLOR TEMP set value in Natural state	0x035	COLOR TEMP				NORMAL	NORMAL

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

- 9.1 Introduction
- 9.2 The various circuits
- 9.3 Abbreviation List
- 9.4 IC Data Sheets

9.1 Introduction

The SK5.0L CA is a CRT TV for the year 2007, based on the 5P19 platform. In this chapter, only a general description of the various circuits is given. For more detailed information, see the circuit diagrams in this manual.

9.2 The various circuits

9.2.1 Tuner

The function of the tuner is to select the channel to be received and suppress the interference of neighboring channels, to amplify the high frequency signal, to improve the receiving sensitivity and SNR, and to generate a PIF signal through frequency conversion.

9.2.2 IF Channel

The IF Channel mainly ensures the sensitivity and selectivity of the complete TV set. The IF AMP integrated in the UOCIII is made up of a three-stage dual-differential amplifier with a gain value above 70dB, a SNR of 55dB and a bandwidth of 7 MHz. The video demodulation circuit is made from the built-in PLL Sync Detector. The spectrum of the demodulation carrier is unitary and it is not affected by the content of the video signal. The tuner features stable receptivity while the signal output from the video detector features high fidelity. The built-in PLL circuit of the UOCIII generates a 38.0 MHz or 38.9 MHz demodulation reference signal for the sync detector to demodulate the video signal; this is called "PLL sync demodulation".

9.2.3 Sound Channel

An external ceramic filter is used to select the second SIF signal for the sound channel of UOCIII from the signal output of the video detector. The audio signal is obtained after limiting amplification and demodulation by the intermediate frequency detector for the SIF signal, and then the audio signal is fed to the BTSC stereo/SAP decoder TDA9850. From that it is output to the audio amplifier TFA9842, which drives the speakers to provide the sound. The intermediate frequency detector and volume-control attenuator that are built in the UOCIII are set and adjusted via the CPU.

9.2.4 BTSC stereo/SAP decoder

Input Level Adjustment

The composite input signal is fed to the input level adjustment stage. The control range is from -3.5 to +4.0 dB in steps of 0.5 dB. The maximum input signal voltage is 2 V (RMS).

Stereo Decoder

The output signal of the level adjustment stage is coupled to a low-pass filter which suppresses the baseband noise above 125 kHz. The composite signal is then fed into a pilot detector/pilot cancellation circuit and into the MPX demodulator. The main L + R signal passes a 75 ms fixed de-emphasis filter and is fed into the dematrix circuit. The decoded sub-signal L - R is sent to the stereo/SAP switch. To generate the pilot signal the stereo demodulator uses a PLL circuit including a ceramic

resonator. The stereo channel separation is adjusted by an automatic procedure to be performed during set production. The stereo identification can be read by the I²C-bus. Two different pilot thresholds (data STS = 1; STS = 0) can be selected via the I²C-bus.

SAP Demodulator

The composite signal is fed from the output of the input level adjustment stage to the SAP demodulator circuit through a 5fH band-pass filter. The demodulator level is automatically controlled. The SAP demodulator includes an internal field strength detector that mutes the SAP output in the event of insufficient signal conditions. The SAP identification signal can be read by the I²C-bus.

Noise Detector

The composite input noise increases with decreasing antenna signal. This makes it necessary to switch stereo or SAP off at certain thresholds. These thresholds can be set via the I²C-bus. With ST0 to ST3 the stereo threshold can be selected and with SP0 to SP3 the SAP threshold. A hysteresis can be achieved via software by making the threshold dependent of the identification bits STP and SAPP.

Mode Selection

The stereo/SAP switch feeds either the L - R signal or the SAP demodulator output signal via the internal dbx noise reduction circuit to the dematrix/switching circuit. Different switch modes provided at the output pins OUTR and OUTL are available.

dbx Decoder

The dbx circuit includes all blocks required for the noise reduction system in accordance with the BTSC system specification. The output signal is fed through a 73 ms fixed de-emphasis circuit to the dematrix block.

SAP Output

Independent of the stereo/SAP switch, the SAP signal is also available at pin SAP. At SAP, the SAP signal is not dbx decoded. The capacitor at SDE provides a recommended de-emphasis (150 ms) at SAP.

Integrated Filters

The filter functions necessary for stereo and SAP demodulation and part of the dbx filter circuits are provided on-chip using transistor circuits. The required filter accuracy is attained by an automatic filter alignment circuit.

9.2.5 CRT Drive Circuit

In the driver circuit, both the voltage and current of the R/G/B signal are amplified, after which the CRT drive circuit modulates the cathode beam current of the CRT. The R/G/B signal input into the driver circuit is of negative polarity.

9.2.6 Power Supply Circuit

The function of the power supply circuit is to supply various stabilized operating voltages and to provide protections against excessive voltages and currents.

9.3 Abbreviation List

2CS	2 Carrier Sound	H-FLYBACK	Horizontal Flyback
A2	Commonly known as 2 Carrier Sound (2CS) system	H-OUT	H_sync output of the module / Horizontal Output pulse
AC	Alternating Current	HA	Horizontal Acquisition; horizontal sync pulse
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page	HFB	Horizontal Flyback Pulse; Horizontal sync pulse from large signal deflection Hardware
ADC	Analogue to Digital Converter	HW	Monochrome TV system. Sound carrier distance is 6.0 MHz. VHF- and UHF-band
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency	I	Inter IC bus (also called IIC)
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box	I ² C	Inter IC Sound bus
AM	Amplitude Modulation	I ² S	Integrated Circuit
ANC	Automatic Noise Reduction; One of the algorithms of Auto TV	IC	Intermediate Frequency
AP	Asia Pacific	IF	Inter IC bus (also called I2C)
AR	Aspect Ratio: 4 by 3 or 16 by 9	IIC	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
AV	Audio Video	Interlaced	In/Out
AVL	Automatic Volume Level control	IO	Infra Red
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz	IR	Left audio channel
BCL	Beam Current Limiter	L	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
CBA	Circuit Board Assembly (or PWB)	L/L'	LATIn AMerica
CFR	Carbon Film Resistor	LATAM	Light Emitting Diode
ComPair	Computer aided rePair	LED	Line Output Transformer (also called FBT); The transformer in which the EHT is generated
CRT	Cathode Ray Tube (or picture tube)	LOT	Loud Speaker
CVBS	Composite Video Blanking and Synchronisation	LS	Monochrome TV system. Sound carrier distance is 4.5 MHz. M= 525 lines @ 60 Hz, N= 625 lines @ 50 Hz
CVI	Component Video Input	M/N	Metal Oxide Film Resistor
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz. D= VHF-band, K= UHF-band	MOFR	Metal Oxide Semiconductor Field Effect Transistor
DAC	Digital to Analogue Converter	MOSFET	MultiPleX
DC	Direct Current	MPX	North American Free Trade Association: Trade agreement between Canada, USA and Mexico
DC-filament	Filament supply voltage	NAFTA	Not Connected
DFU	Directions For Use: owner's manual	NC	Near Instantaneously Companded Audio Multiplexing; This is a digital sound system, mainly used in Europe
DPL	Dolby Pro Logic	NICAM	Negative Temperature Coefficient, non-linear resistor (resistance decreases if temperature increases)
DRAM	Dynamic RAM; dynamically refreshed RAM	NTC	National Television Standard Committee. Colour system used mainly in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
DVD	Digital Versatile Disc	NTSC	Non Volatile Memory; IC containing data such as alignment values, preset stations
EEPROM	Electrically Erasable and Programmable Read Only Memory	NTSC	Option Byte
EHT	Extreme High Tension; the voltage between the cathode and the shadow mask that accelerates the electrons towards the screen (around 25 kV)	NTSC	Open Circuit
EMI	Electro Magnetic Interference; Leakage of high-frequency radiation from a transmission medium	NTSC	OPTION byte
EU	EUrope	NTSC	On Screen Display
EW	East West, related to horizontal deflection of the set	NTSC	Project 50; Communication protocol between TV and peripherals
EW-DRIVE	East -West correction drive signal.	NTSC	Phase Alternating Line; Colour system mainly used in West Europe (colour carrier= 4.433619 MHz) and South America (colour carrier PAL M= 3.575612 MHz and PAL N= 3.582056 MHz)
EXT	EXTERNAL (source), entering the set by SCART or by cinches (jacks)	NTSC	Printed Circuit Board (or PWB)
FBL	Fast Blanking: DC signal accompanying RGB signals	NTSC	Phase Locked Loop; Used for e.g. FST tuning systems. The customer
FE	Front End; Tuner and RF part together	NTSC	
Field	Each interlaced broadcast FRAME is composed of two Fields, each Field consists of either Odd or Even lines	NTSC	
Filament	Filament of CRT	NTSC	
FM	Field Memory / Frequency Modulation	NTSC	
Frame	A complete TV picture comprising all lines (625/525)	NTSC	
FTV	Flat TeleVision	NTSC	
G	Green	NTSC	
H	H_sync to the module	NTSC	
H-DRIVE	Horizontal Drive	NTSC	

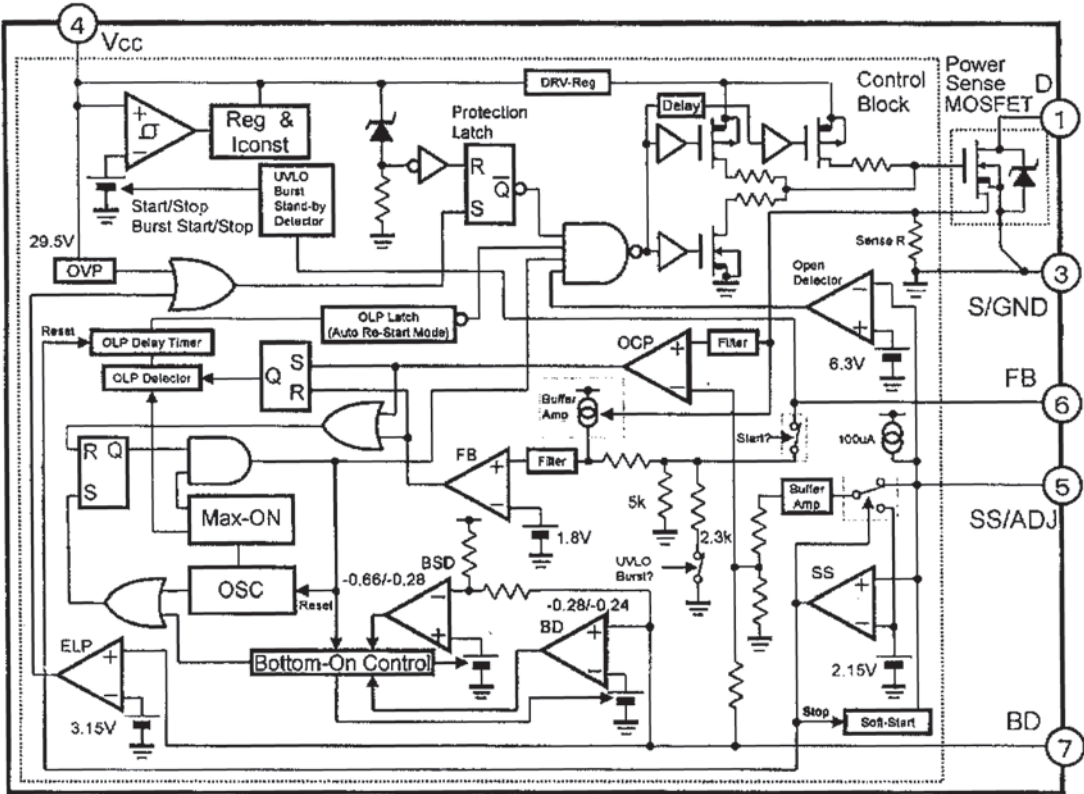
	can directly provide the desired frequency
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTC	Positive Temperature Coefficient, non linear resistor (resistance increases if temperature increases)
PWB	Printed Wiring Board (also called PCB or CBA)
QSS	Quasi Split Sound
R	Right audio channel / Red
RAM	Random Access Memory
RC	Remote Control transmitter
RC5 (6)	Remote Control system 5 (6), the signal from the remote control receiver
RF	Real Flat (picture tube) or Radio Frequency
RGB	Red, Green, and Blue colour space; The primary colour signals for TV. By mixing levels of R, G, and B, all colours (Y/C) are reproduced
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
RMS	Root Mean Square value
ROM	Read Only Memory
SAP	Secondary Audio Program; Generally used to transmit audio in a second language
SAW	Surface Acoustic Wave
SC	SandCastle: two-level pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock signal on I ² C bus
SD	Standard Definition
SDA	Serial Data line of I ² C bus
SDRAM	Synchronous DRAM
SIF	Sound Intermediate Frequency
SMC	Surface Mounted Component
SMD	Surface Mounted Device
SMPS	Switched Mode Power Supply
SND	SouND
SRAM	Static RAM
STBY	STandBY
SVHS	Super Video Home System
TBD	To Be Defined
TXT	Teletext; TXT is a digital addition to analogue TV signals that contain textual and graphical information (25 rows x 40 columns). The information is transmitted within the first 25 lines during the Vertical Blank Interval (VBI)
µC	Microcontroller
UOC	Ultimate One Chip
µP	Microprocessor
UV	Colour difference signals
V	V_sync
V-BAT	Main supply for deflection (usually 141 V)
VA	Vertical Acquisition
VBI	Vertical Blanking Interval; Time during which the video signal is blanked when going from bottom to top of the display
VCR	Video Cassette Recorder
VGA	Video Graphics Array
VIF	Video Intermediate Frequency
WE	Write Enable control line
WST	World System Teletext
XTAL	Quartz crystal
Y	Luminance signal

9.4 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as “black boxes” in the electrical diagrams.

9.4.1 Diagram A1, W6554A, (IC601)

Block diagram (Connection diagram)



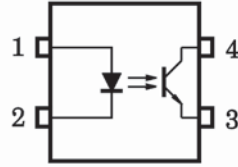
Functions of Each Terminal

Terminal No.	Symbols	Descriptions	Functions
1	D	Drain terminal	MOSFET drain
3	S/GND	Source and Ground terminal	MOSFET Source and Ground
4	VCC	Power supply terminal	Input of power supply for control circuit
5	SS/ADJ	Soft Start and Over-current protection adjustment Terminal	Adjustment of over-current protection and Soft Start Operation Time set up
6	FB	Feedback terminal	Constant Voltage Control Signal Input and Burst(intermittent) mode Oscillation Control
7	BD	Bottom Detection Terminal	Bottom Detection Signal Input and External Latch Signal Input

H_17210_039.eps
120607

Figure 9-1 Block Diagram and Pin Configuration

9.4.2 Diagram A1, P412, (IC602)

PIN CONFIGURATIONS
(TOP VIEW)

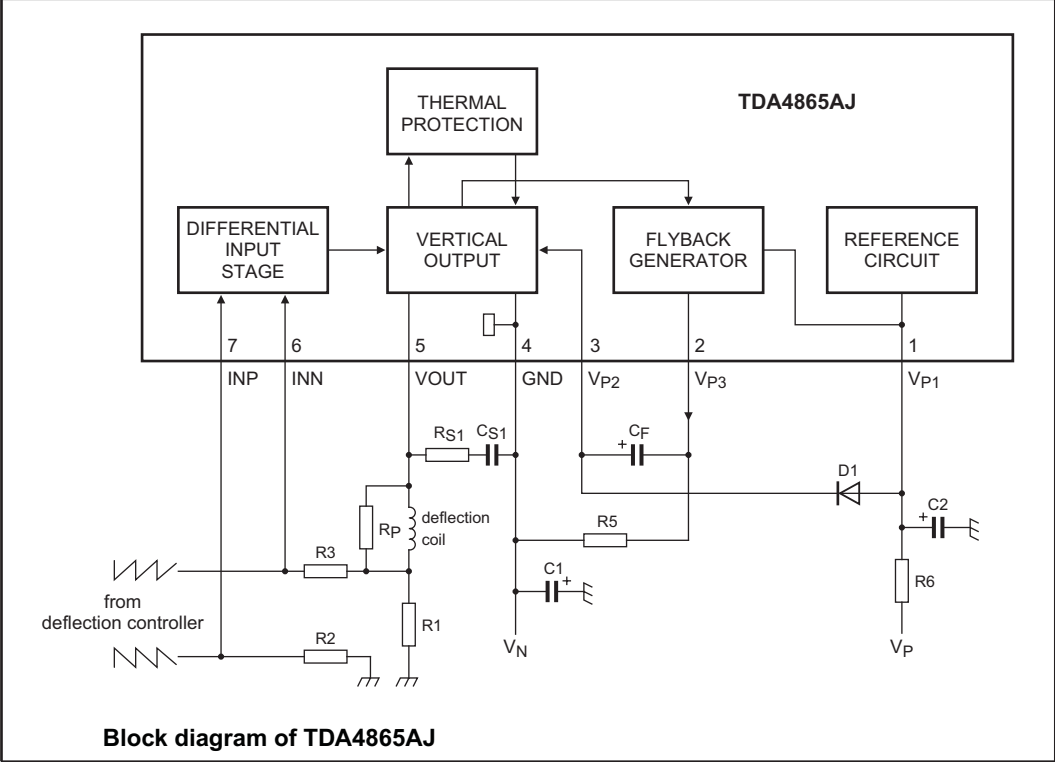
1 : ANODE
2 : CATHODE
3 : EMITTER
4 : COLLECTOR

H_17210_039.eps
120607

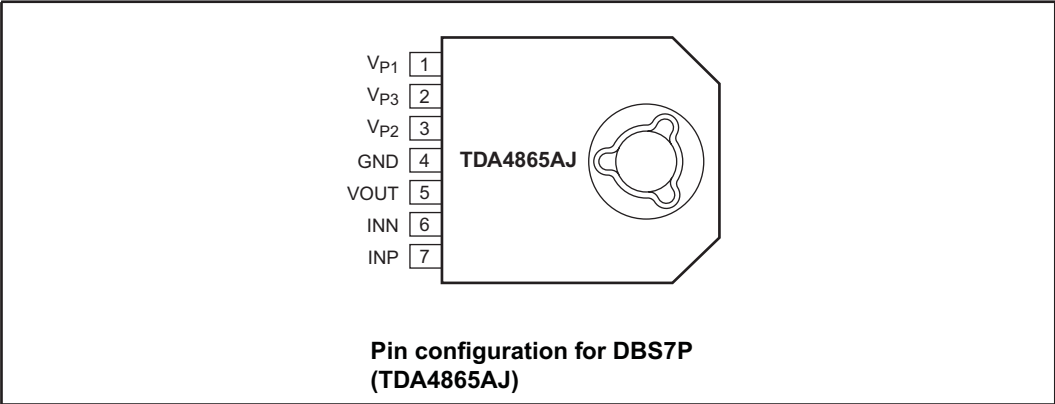
Figure 9-2 Block Diagram and Pin Configuration

9.4.3 Diagram A3, TDA486x, (IC301)

Block Diagram

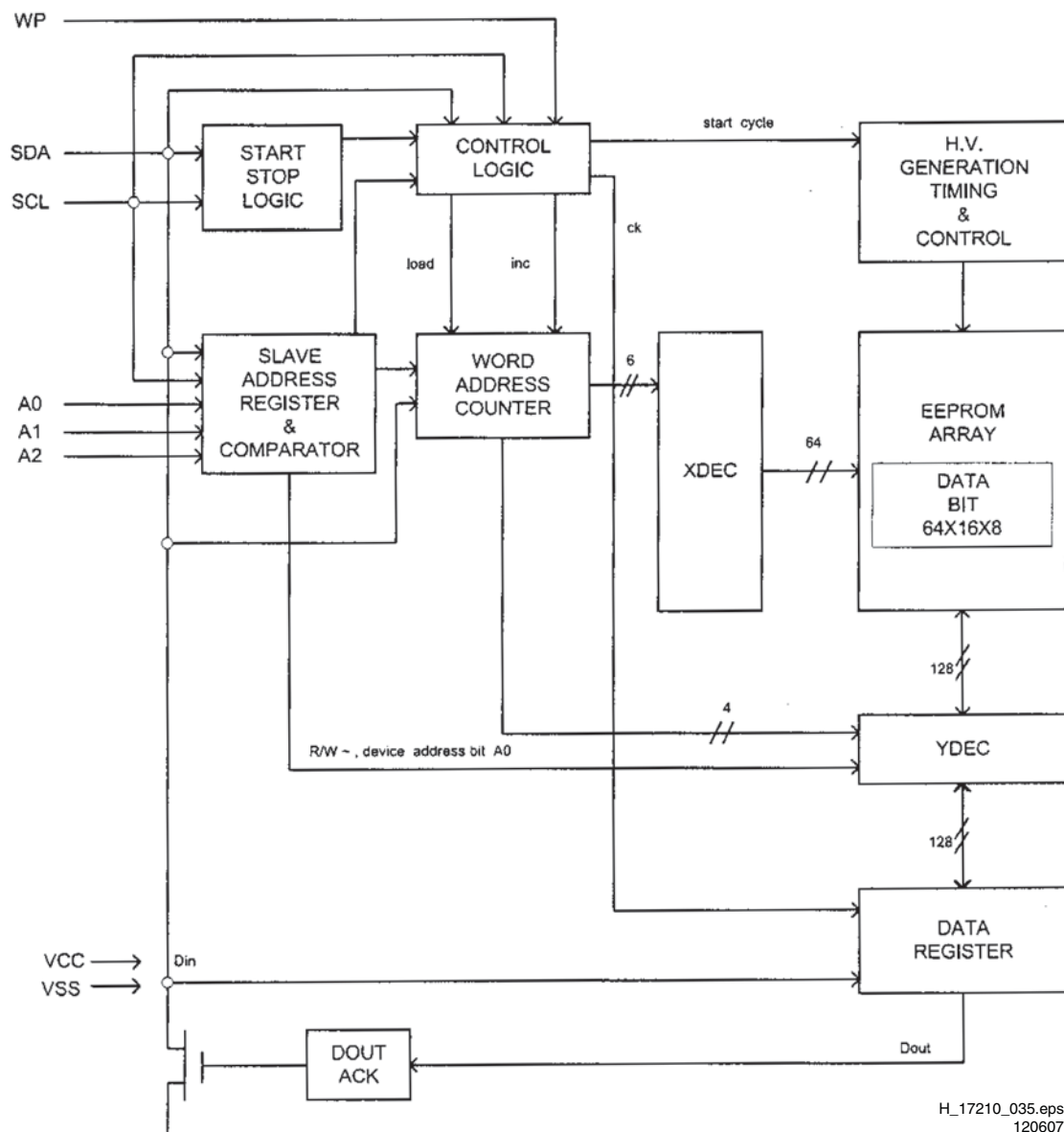


Pin Configuration



H_17210_038.eps
120607

Figure 9-3 Block Diagram and Pin Configuration

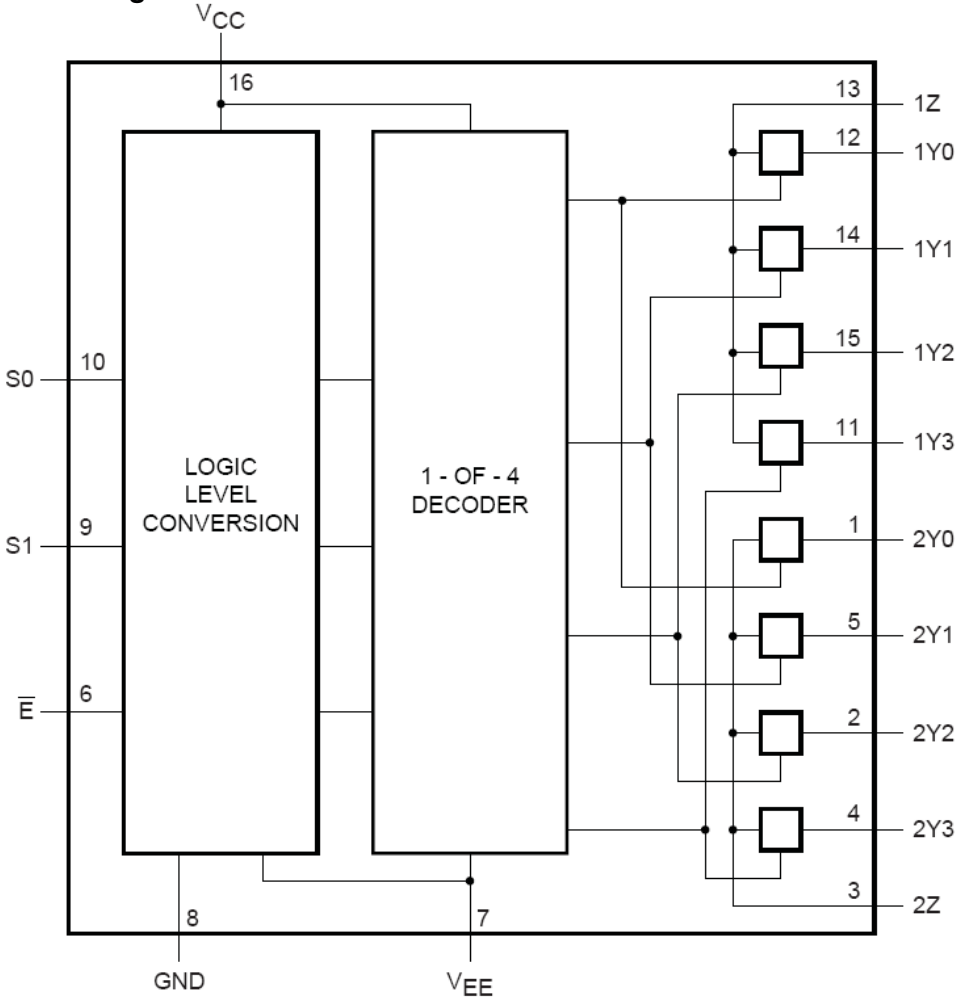
BLOCK DIAGRAM

H_17210_035.eps
120607

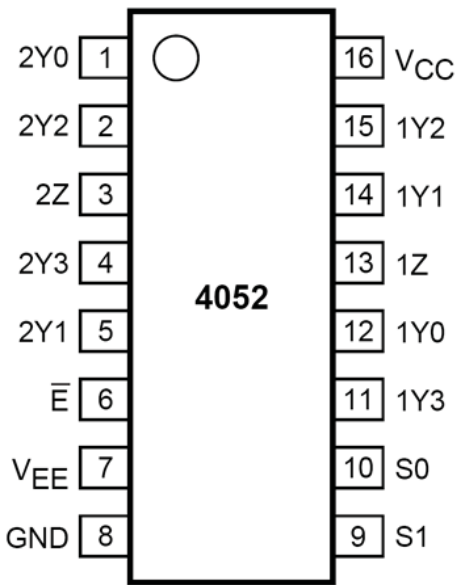
Figure 9-4 Block Diagram

9.4.4 Diagram A5, 4052, (IC102)

Block Diagram



Pin Configuration

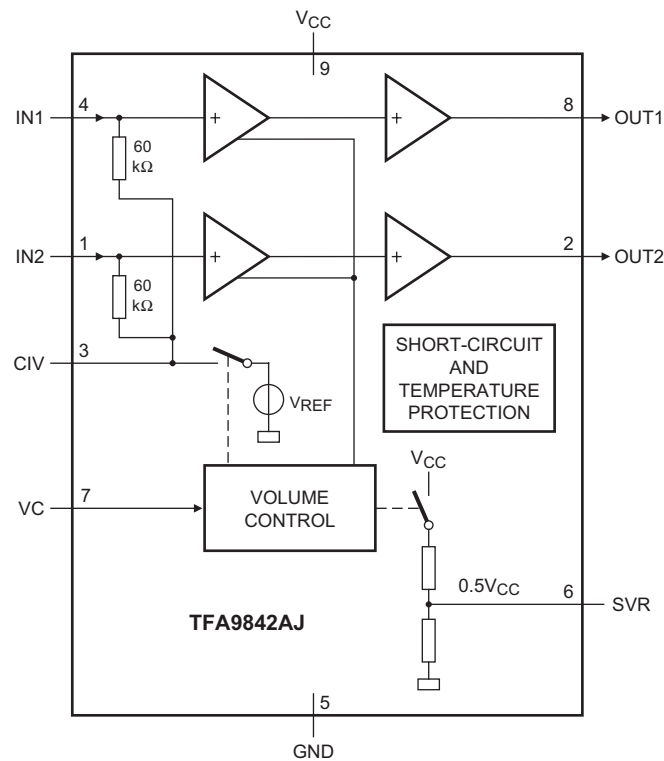


H_17210_041.eps
120607

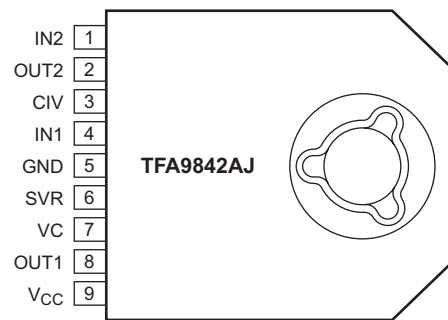
Figure 9-5 Block Diagram and Pin Configuration

9.4.5 Diagram A7, TDA9842, (IC402)

Block Diagram



Pin Configuration

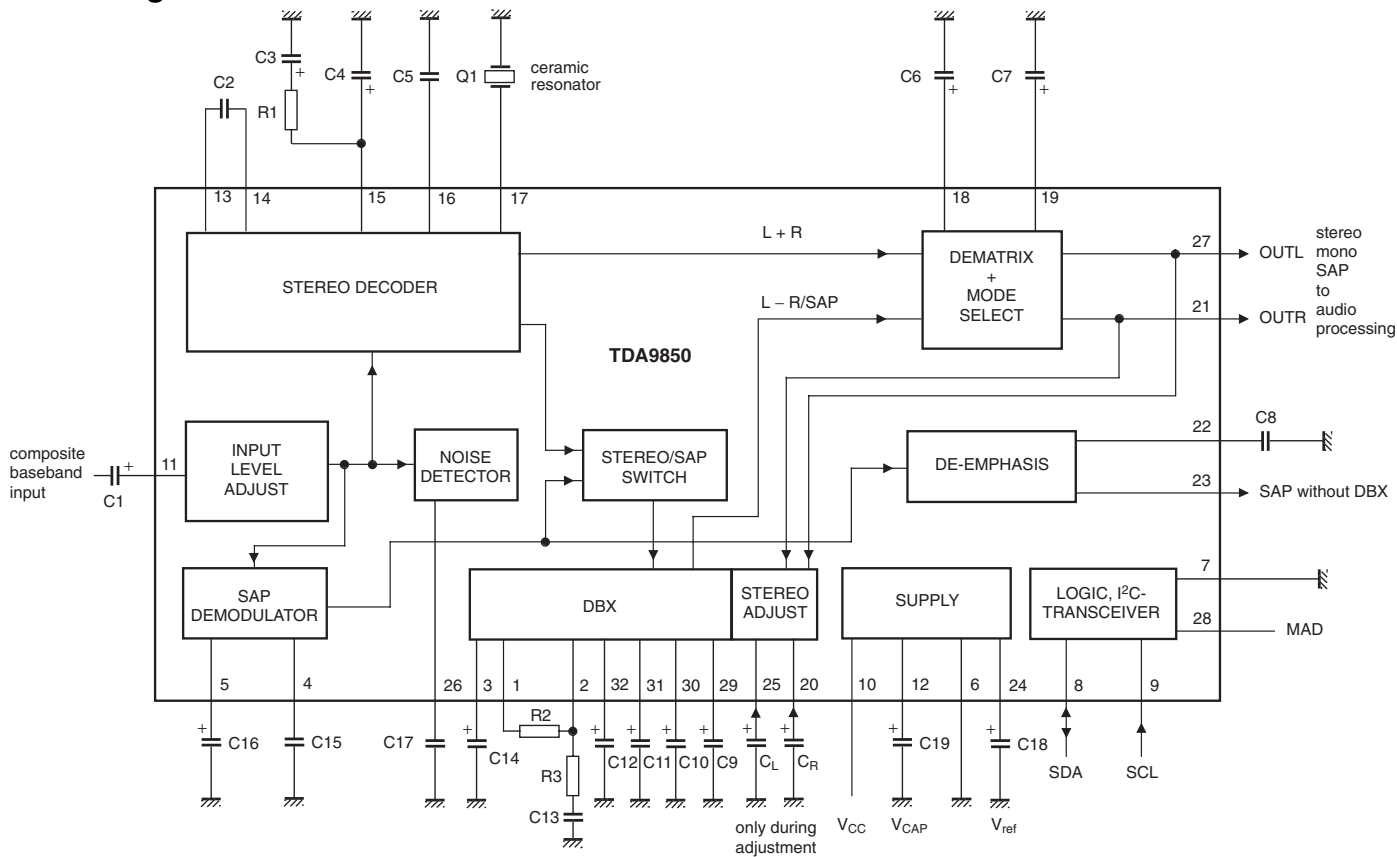


H_17210_033.eps
110607

Figure 9-6 Block Diagram and Pin Configuration

9.4.6 Diagram A7, TDA9850, (IC801)

Block Diagram



Pin Configuration

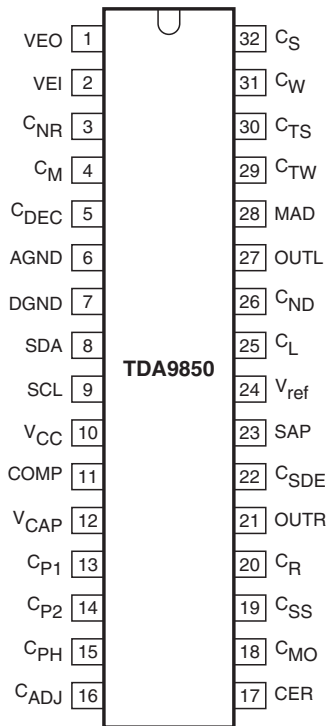


Figure 9-7 Block Diagram and Pin Configuration

9.4.7 Diagram A8, OM837x (IC201)

Block Diagram

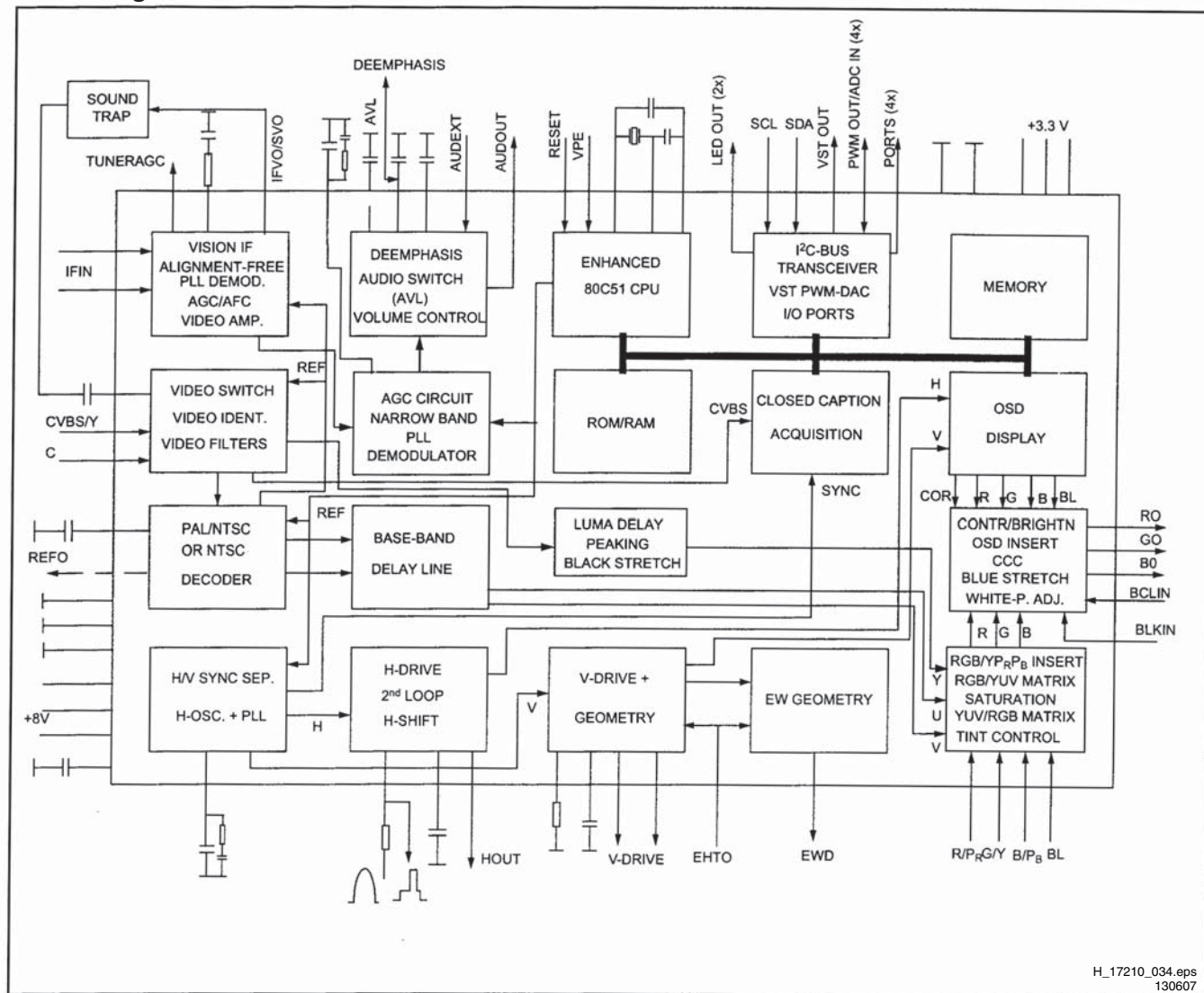
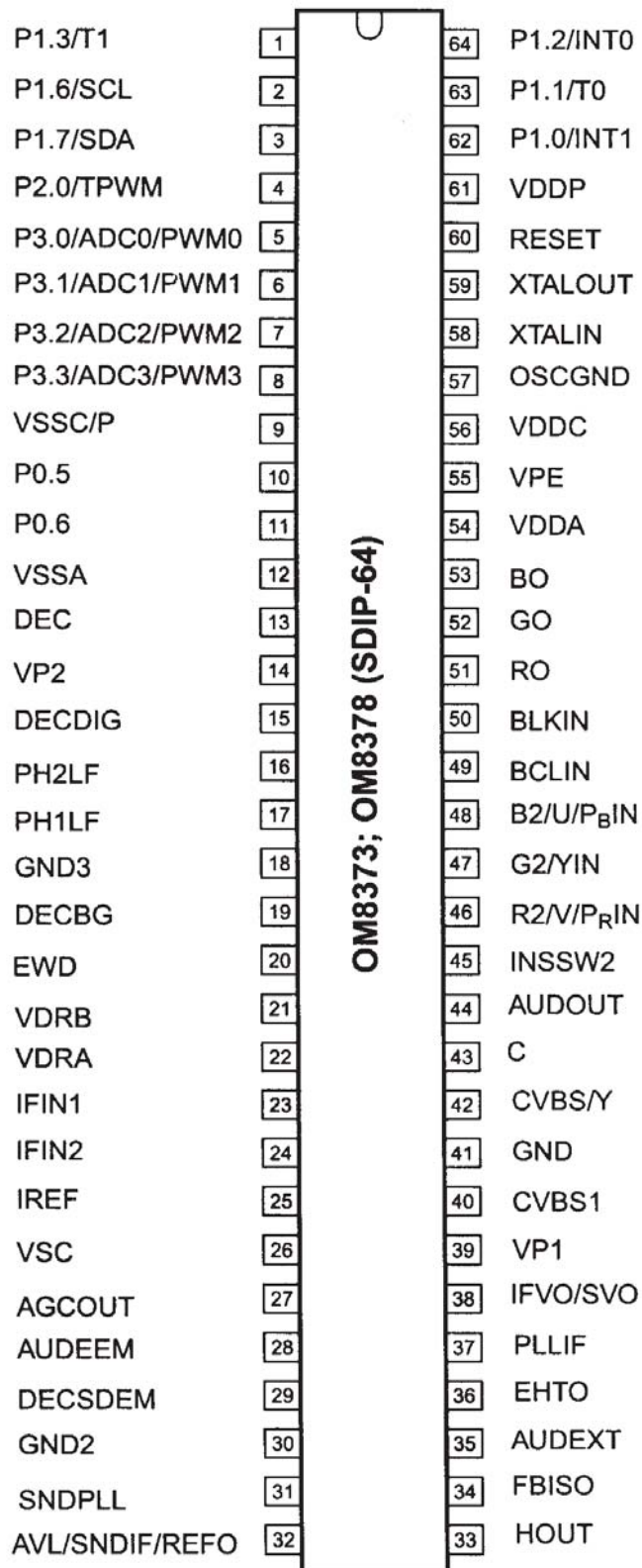


Figure 9-8 Block Diagram

Pin Configuration



H_17210_029.eps
130607

Figure 9-9 Pin Configuration

PINNING

SYMBOL	PIN	DESCRIPTION
P1.3/T1	1	port 1.3 or Counter/Timer 1 input
P1.6/SCL	2	port 1.6 or I ² C-bus clock line
P1.7/SDA	3	port 1.7 or I ² C-bus data line
P2.0/TPWM	4	port 2.0 or Tuning PWM output
P3.0/ADC0/PWM0	5	port 3.0 or ADC0 input or PWM0 output
P3.1/ADC1/PWM1	6	port 3.1 or ADC1 input or PWM1 output
P3.2/ADC2/PWM2	7	port 3.2 or ADC2 input or PWM2 output
P3.3/ADC3/PWM3	8	port 3.3 or ADC3 input or PWM3 output
VSSC/P	9	digital ground for μ -Controller core and periphery
P0.5	10	port 0.5 (8 mA current sinking capability for direct drive of LEDs)
P0.6	11	port 0.6 (8 mA current sinking capability for direct drive of LEDs)
VSSA	12	digital ground of TV-processor
DEC	13	decoupling
VP2	14	2 nd supply voltage TV-processor (+8V)
DECDIG	15	supply voltage decoupling of digital circuit of TV-processor
PH2LF	16	phase-2 filter
PH1LF	17	phase-1 filter
GND3	18	ground 3 for TV-processor
DECBG	19	bandgap decoupling
EWD	20	E-W drive output
VDRB	21	vertical drive B output
VDRA	22	vertical drive A output
IFIN1	23	IF input 1
IFIN2	24	IF input 2
IREF	25	reference current input
VSC	26	vertical sawtooth capacitor
AGCOUT	27	tuner AGC output
AUDEEM	28	audio deemphasis
DECSDEM	29	decoupling sound demodulator
GND2	30	ground 2 for TV processor
SNDPLL	31	narrow band PLL filter
AVL/REFO/SNDIF ⁽¹⁾	32	Automatic Volume Levelling / subcarrier reference output / sound IF input
HOUT	33	horizontal output
FBISO	34	flyback input/sandcastle output
AUDEXT	35	external audio input
EHTO	36	EHT/overvoltage protection input
PLLIF	37	IF-PLL loop filter
IFVO/SVO	38	IF video output / selected video output

H_17210_030.eps
130607

Figure 9-10 Pin Configuration

Pinning

SYMBOL	PIN	DESCRIPTION
VP1	39	main supply voltage TV processor
CVBS1	40	internal CVBS input
GND	41	ground for TV processor
CVBS3/Y	42	CVBS3/Y input
C	43	chroma input
AUDOUT	44	audio output
INSSW2	45	2 nd RGB / YUV insertion input
R2/V/P _R IN	46	2 nd R input / V (R-Y) input / P _R input
G2/YIN	47	2 nd G input / Y input
B2/U/P _B IN	48	2 nd B input / U (B-Y) input / P _B input
BCLIN	49	beam current limiter input
BLKIN	50	black current input / V-guard input
RO	51	Red output
GO	52	Green output
BO	53	Blue output
VDDA	54	analog supply of Teletext decoder and digital supply of TV-processor (3.3 V)
VPE	55	OTP Programming Voltage
VDDC	56	digital supply to core (3.3 V)
OSCGND	57	oscillator ground supply
XTALIN	58	crystal oscillator input
XTALOUT	59	crystal oscillator output
RESET	60	reset
VDDP	61	digital supply to periphery (+3.3 V)
P1.0/INT1	62	port 1.0 or external interrupt 1 input
P1.1/T0	63	port 1.1 or Counter/Timer 0 input
P1.2/INT0	64	port 1.2 or external interrupt 0 input

Note

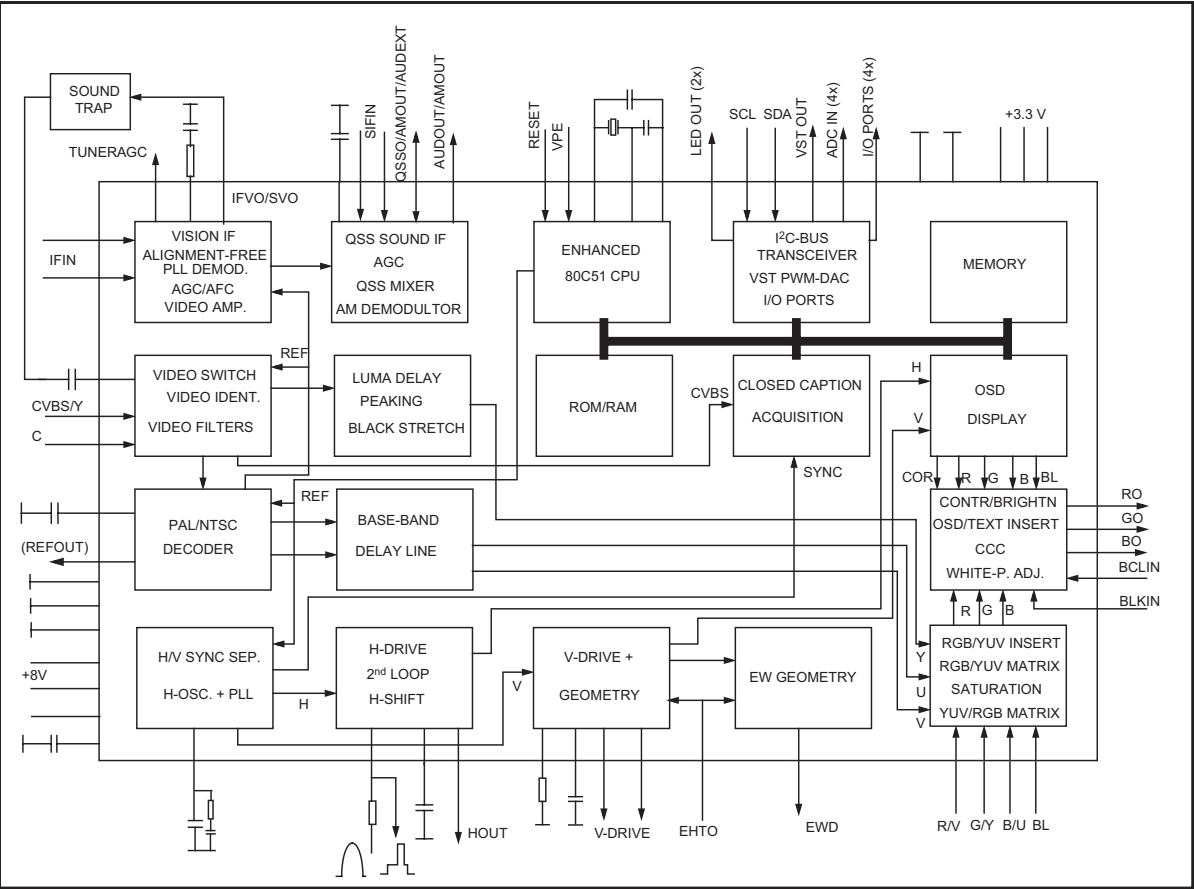
1. The function of this pin is controlled by the CMB1/CMB0 bits in subaddress 22H and the SIF bit in subaddress 28H.

H_17210_031.eps
130607

Figure 9-11 Pin Configuration

9.4.8 Diagram A8, TDA937x (IC201)

Block Diagram



Pin Configuration

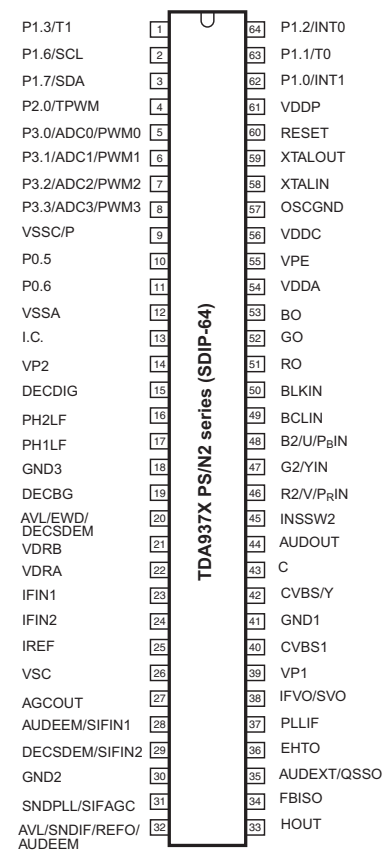


Figure 9-12 Block diagram and pin configuration

9.4.9 Diagram A8, 24C08 (IC202)

BLOCK DIAGRAM

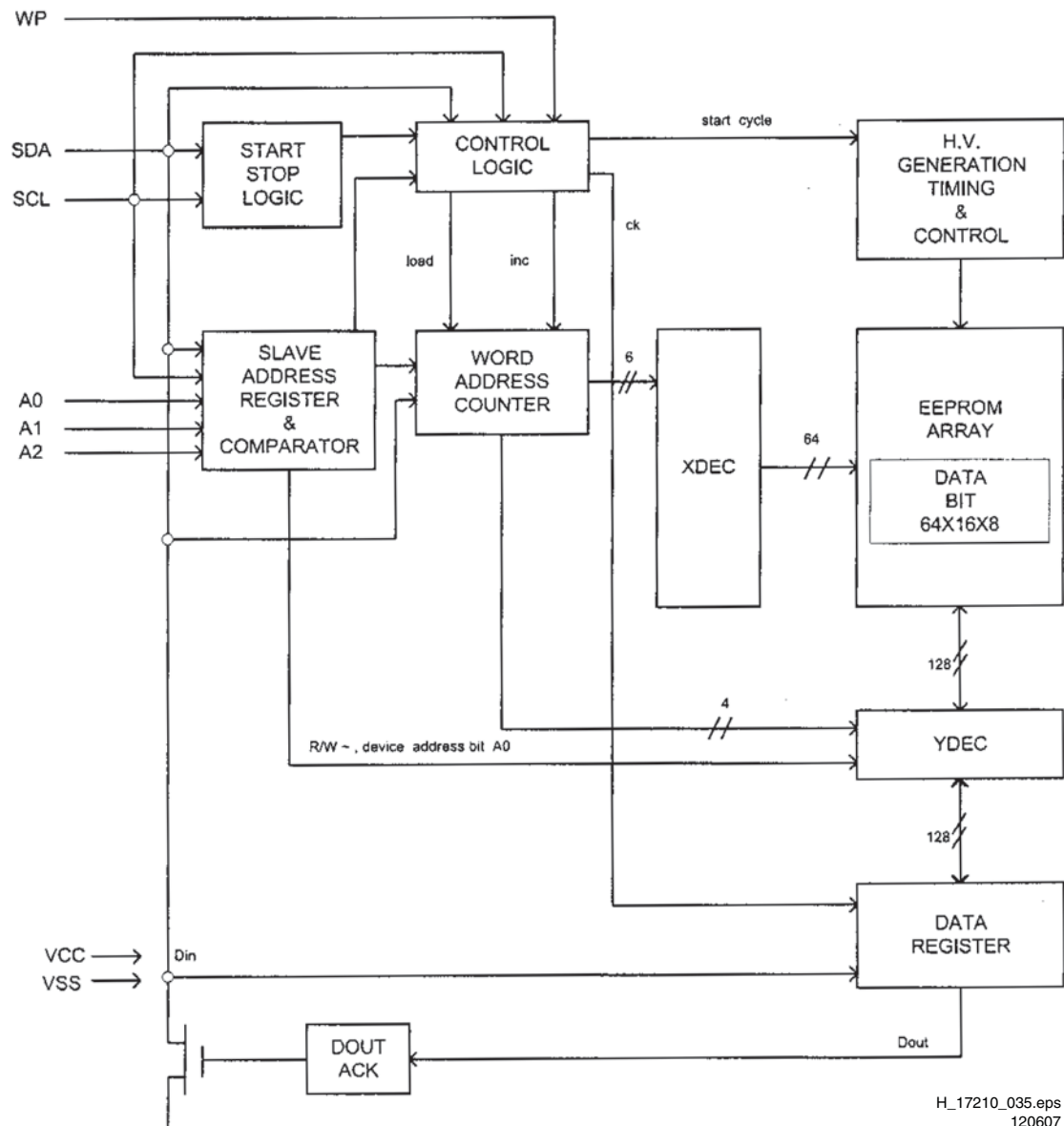
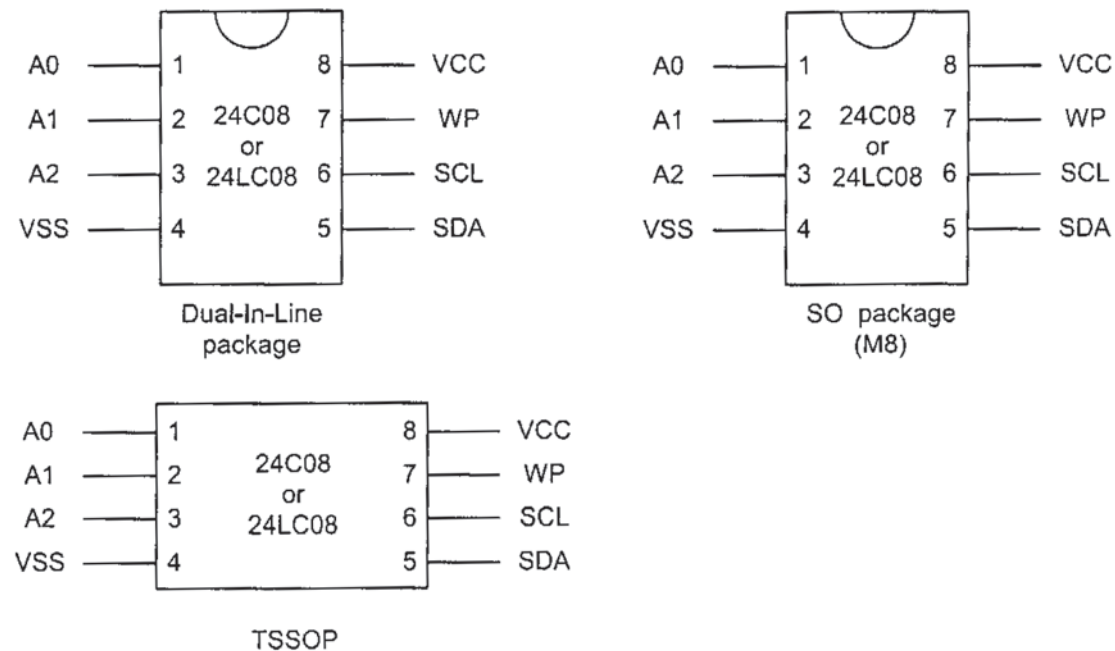
H_17210_035.eps
120607

Figure 9-13 Block Diagram

Pin Configuration



Pin Name

A0, A1	N.C.
A2	Device Address inputs
Vss	Ground
SDA	Data I/O
SCL	Clock input
WP	Write Protect
Vcc	+ 5 V or + 3 V

H_17210_036.eps
120607

Figure 9-14 Pin Configuration

10. Spare Parts List

CTN's Listed:

1)	8670 000 34071	29PT9457/44
2)	8670 000 34069	29PT9457/55

Mono Carrier [A]

Various

F601	9965 000 40615	Fuse T3.15A 250V
P702	9965 200 31263	RCA Jack
PTC601	9965 100 04865	Ther Resistor 9Ω for 29"
S501	9965 100 05376	CRT Socket GZS10
SAW101	9965 100 07702	SAW SW05 45.75MHz
X101	9965 000 40264	Xtal 12.0MHz HC-49/U
X851	9965 100 07714	Ceramic Res. 503kHz
XT155	9965 100 07703	Ceramic Trap 4.5MHz
ZD101	9965 000 40221	Zener 5V1 1/2W 5%
ZD102	9965 000 40221	Zener 5V1 1/2W 5%
ZD103	9965 000 40224	Zener 8V2 1/2W 5%
ZD104	9965 000 40224	Zener 8V2 1/2W 5%
ZD105	9965 000 40224	Zener 8V2 1/2W 5%
ZD106	9965 000 40224	Zener 8V2 1/2W 5%
ZD107	9965 000 40224	Zener 8V2 1/2W 5%
ZD108	9965 000 40224	Zener 8V2 1/2W 5%
ZD401	9965 000 40224	Zener 8V2 1/2W 5%
ZD402	9965 100 04909	Zener Diode 18V 1/2W
ZD440	9965 000 40224	Zener 8V2 1/2W 5%
ZD501	9965 000 40224	Zener 8V2 1/2W 5%
ZD602	9965 100 04909	Zener Diode 18V 1/2W
ZD620	9965 000 40221	Zener 5V1 1/2W 5%
ZD621	9965 000 40220	Zener 3V9 1/2W 5%
ZD622	9965 000 40220	Zener 3V9 1/2W 5%
ZD701	9965 000 40224	Zener 8V2 1/2W 5%
ZD702	9965 000 40224	Zener 8V2 1/2W 5%
ZD705	9965 000 40224	Zener 8V2 1/2W 5%
ZD706	9965 000 40224	Zener 8V2 1/2W 5%
ZD707	9965 000 40224	Zener 8V2 1/2W 5%
ZD708	9965 000 40224	Zener 8V2 1/2W 5%
ZD709	9965 000 40224	Zener 8V2 1/2W 5%
ZD710	9965 000 40224	Zener 8V2 1/2W 5%
ZD711	9965 000 40224	Zener 8V2 1/2W 5%
ZD712	9965 000 40224	Zener 8V2 1/2W 5%
ZD713	9965 000 40224	Zener 8V2 1/2W 5%
ZD714	9965 000 40224	Zener 8V2 1/2W 5%
ZD715	9965 000 40224	Zener 8V2 1/2W 5%

g

C101	9965 000 40156	0.01μF 50V
C103	9965 000 40156	0.01μF 50V
C105	9965 000 40156	0.01μF 50V
C107	9965 000 41097	100pF 50V
C108	9965 000 41097	100pF 50V
C109	9965 000 40171	10μF 20% 16V
C111	9965 000 41097	100pF 50V
C112	9965 000 41097	100pF 50V
C113	9965 000 40174	220μF 20% 16V
C114	9965 100 04885	0.47μF 20% 50V
C116	9965 000 40178	1μF 20% 50V
C117	9965 000 40172	100μF 20% 16V
C118	9965 000 40156	0.01μF 50V
C119	9965 000 40171	10μF 20% 16V
C120	9965 100 04891	0.1μF 5% 63-100V
C126	9965 000 40157	0.1μF 50V
C127	9965 100 04892	0.22μF 5% 63-100V
C128	9965 000 40156	0.01μF 50V
C129	9965 000 40171	10μF 20% 16V
C130	9965 100 04892	0.22μF 5% 63-100V
C131	9965 100 04867	0.0022μF +80-20% 50V
C132	9965 100 04870	0.0047μF +80-20% 50V
C133	9965 000 40178	1μF 20% 50V
C135	9965 100 04891	0.1μF 5% 63-100V
C136	9965 100 07709	180pF 50V
C137	9965 000 40171	10μF 20% 16V
C138	9965 000 40208	Mylar 0.0015μF 100V
C139	9965 000 40159	330pF 50V
C140	9965 000 41112	4.7μF 20% 16V
C144	9965 100 05386	0.01μF 5% 100V
C145	9965 000 40172	100μF 20% 16V
C146	9965 000 40157	0.1μF 50V
C147	9965 000 40529	33pF 50V
C148	9965 000 40529	33pF 50V
C149	9965 000 40156	0.01μF 50V
C150	9965 000 40172	100μF 20% 16V
C160	9965 000 40531	470pF 50V
C161	9965 000 40531	470pF 50V

C162	9965 000 40529	33pF 50V
C402	9965 000 40164	0.0022μF 500V
C403	9965 000 40163	220pF 500V
C404	9965 000 40181	4.7μF 50V-100V 20%
C405	9965 100 04885	0.47μF 20% 50V
C409	9965 000 40157	0.1μF 50V
C410	9965 000 40179	10μF 20% 50V-63V
C431	9965 000 40557	0.0039μF 5% 2kV
C432	9965 100 04895	0.0072μF 5% 2kV
C433	9965 000 41145	PFC 0.033μF 5% 630V
C435	9965 100 07716	0.56μF 5% 400V
C436	9965 100 05384	560pF 10% 2kV
C437	9965 000 40185	10μF 20% 250V
C438	9965 100 04894	0.0027μF 5% 2kV
C440	9965 100 05402	4.7μF 5%
C441	9965 000 40156	0.01μF 50V
C442	9965 100 05383	0.0022μF 10% 2kV
C443	9965 000 40202	MP 0.056μF 250V 5%
C444	9965 100 05367	39pF 5% 50V
C445	9965 000 40209	Mylar 0.0022μF 100V
C452	9965 100 07700	2200μF
C453	9965 100 07700	2200μF
C455	9965 100 07710	220μF
C456	9965 000 40560	Mylar 0.1μF 100V
C459	9965 000 40560	Mylar 0.1μF 100V
C460	9965 000 40526	0.001μF 50V
C461	9965 000 40526	0.001μF 50V
C462	9965 100 05384	560pF 10% 2kV
C463	9965 100 07715	PFC 0.39μF 400V +/-5%
C464	9965 100 05626	PFC
C465	9965 100 05627	0.47μF 5% 400V
C501	9965 000 40159	330pF 50V
C502	9965 000 40159	330pF 50V
C503	9965 000 40159	330pF 50V
C504	9965 100 04876	0.001μF 10% 2kV
C508	9965 100 04866	0.001μF 5% 50V
C600	9965 000 40567	0.1μF A C250V-500V
C601	9965 000 40217	0.22μF 250V - 500V
C602	9965 000 40217	0.22μF 250V - 500V
C603	9965 000 40217	0.22μF 250V - 500V
C603A	9965 000 41100	0.0047μF 500V
C603B	9965 000 41100	0.0047μF 500V
C603C	9965 100 05399	0.0047μF 10% 500V
C603D	9965 000 41100	0.0047μF 500V
C604	9965 000 41105	CerCap 0.001mF 2kV
C605	9965 100 04891	0.1μF 5% 63-100V
C606	9965 100 04874	470pF 10% 500V
C607	9965 000 40564	220μF
C608	9965 000 40179	10μF 20% 50V-63V
C609	9965 100 05386	0.01μF 5% 100V
C610	9965 000 40216	Safety CerCap 0.002μF
C611	9965 000 40566	470pF 10% 400Vac
C612	9965 000 40566	470pF 10% 400Vac
C620	9965 000 40166	680pF 500V
C621	9965 100 05401	100μF 2% 200V
C622	9965 100 05400	1000μF 20% 63V
C623	9965 000 40166	680pF 500V
C624	9965 000 40166	680pF 500V
C625	9965 000 40173	1000μF
C626	9965 000 40173	1000μF
C627	9965 100 04883	1000μF 20% 25V
C628	9965 100 04883	1000μF 20% 25V
C629	9965 100 05400	1000μF 20% 63V
C631	9965 000 40172	100μF 20% 16V
C632	9965 100 05317	47μF 20% 250V
C634	9965 000 40157	0.1μF 50V
C639	9965 000 40175	47μF 20% 16V
C640	9965 000 40174	220μF 20% 16V
C641	9965 000 41109	2200μF 20% 16V
C642	9965 000 40173	1000μF
C701	9965 100 04866	0.001μF 5% 50V
C702	9965 100 04866	0.001μF 5% 50V
C705	9965 000 40171	10μF 20% 16V
C706	9965 000 40171	10μF 20% 16V
C707	9965 000 40171	10μF 20% 16V
C708	9965 000 40171	10μF 20% 16V
C710	9965 000 40176	470μF 20% 16V
C716	9965 000 40171	10μF 20% 16V
C717	9965 000 40171	10μF 20% 16V
C720	9965 000 40171	10μF 20% 16V
C725	9965 100 04891	0.1μF 5% 63-100V
C726	9965 100 04891	0.1μF 5% 63-100V
C727	9965 100 04891	0.1μF 5% 63-100V
C728	9965 000 40172	100μF 20% 16V
C740	9965 000 40172	100μF 20% 16V
C741	9965 100 05388	1μF 20% 50V
C742	9965 100 05388	1μF 20% 50V
C743	9965 000 40561	Mylar 0.015μF 100V
C744	9965 000 40561	Mylar 0.015μF 100V

C745	9965 100 05389	0.068μF 10% 100V
C746	9965 100 05387	0.15μF 5% 100V
C747	9965 000 41097	100pF 50V
C748	9965 000 40563	Mylar 0.0056UF 100V
C749	9965 100 05388	1μF 20% 50V
C750	9965 100 05388	1μF 20% 50V
C751	9965 000 41097	100pF 50V
C752	9965 000 40563	Mylar 0.0056UF 100V
C753	9965 100 05387	0.15μF 5% 100V
C754	9965 100 05389	0.068μF 10% 100V
C760	9965 000 40171	10μF 20% 16V
C761	9965 000 40178	1μF 20% 50V
C762	9965 000 40172	100μF 20% 16V
C764	9965 100 04885	0.47μF 20% 50V
C765	9965 100 04870	0.0047μF +80-20% 50V
C766	9965 100 04870	0.0047μF +80-20% 50V
C767	9965 000 40545	220μF 20% 25V
C768	9965 100 05385	470μF 20% 35V
C769	9965 100 05385	470μF 20% 35V
C770	9965 000 40171	10μF 20% 16V
C771	9965 000 40171	10μF 20% 16V
C772	9965 000 40171	10μF 20% 16V
C773	9965 000 40171	10μF 20% 16V
C774	9965 000 40171	10μF 20% 16V
C775	9965 000 40171	10μF 20% 16V
C776	9965 100 04866	0.001μF 5% 50V
C777	9965 000 40171	10μF 20% 16V
C778	9965 000 40171	10μF 20% 16V
C779	9965 000 40178	1μF 20% 50V
C780	9965 000 40172	100μF 20% 16V
C783	9965 100 04866	0.001μF 5% 50V
C785	9965 000 40171	10μF 20% 16V
C851	9965 100 05388	1μF 20% 50V
C852	9965 100 07708	0.47μF 10% 63-100V
C853	9965 000 41112	4.7μF 20% 16V
C854	9965 100 07706	0.22μF 50V
C855	9965 000 40171	10μF 20% 16V
C856	9965 000 41112	4.7μF 20% 16V
C857	9965 000 41112	4.7μF 20% 16V
C858	9965 000 40561	Mylar 0.015μF 100V
C859	9965 000 40171	10μF 20% 16V
C860	9965 000 40171	10μF 20% 16V
C861	9965 000 40178	1μF 20% 50V
C862	9965 000 40178	1μF 20% 50V
C863	9965 100 07707	0.047μF 50V
C864	9965 000 40171	10μF 20% 16V
C865	9965 000 40157	0.1μF 50V
C866	9965 000 41112	4.7μF 20% 16V
C867	9965 000 40157	0.1μF 50V
C868	9965 000 40172	100μF 20% 16V
C869	9965 000 40172	100μF 20% 16V
C871	9965 100 05388	1μF 20% 50V
C872	9965 100 05388	1μF 20% 50V
C873	9965 000 40180	2.2μF20% 50V
C874	9965 000 40180	2.2μF20% 50V
C875	9965 000 41097	100pF 50V
C876	9965 000 41097	100pF 50V
C877	9965 000 40171	10μF 20% 16V
C878	9965 000 40157	0.1μF 50V
C879	9965 100 05388	1μF 20% 50V

f

R101	9965 000 39984	CFR 75Ω 1/16W
R102	9965 000 40685	CFR 1.5kΩ 1/16W
R103	9965 100 05144	5.1kΩ 5% 1/16-1/6W
R104	9965 000 40691	CFR 220Ω 1/16W
R105	9965 000 40690	CFR 22Ω 1/16W
R106	9965 000 40304	CFR 1KΩ 1/16W
R107	9965 000 40699	CFR 470Ω 1/16W
R108	9965 100 05396	RESIS 33 OHM 1W 5%
R109	9965 000 39976	CFR 10kΩ 1/16W
R110	9965 100 04838	180Ω 5% 1/16-1/6W
R111	9965 000 39975	CFR 100Ω 1/16W
R112	9965 000 39975	CFR 100Ω 1/16W
R113	9965 000 40701	CFR 47kΩ 1/16W
R114	9965 000 40698	CFR 39kΩ 1/16W
R120	9965 000 40304	CFR 1KΩ 1/16W
R121	9965 000 39976	CFR 10kΩ 1/16W
R122	9965 000 39976	CFR 10kΩ 1/16W
R125	9965 000 40691	CFR 220Ω 1/16W
R126	9965 100 04838	180Ω 5% 1/16-1/6W
R127	9965 000 39975	CFR 100Ω 1/16W
R130	9965 000 40695	CFR 3.3kΩ 1/16W
R131	9965 000 40695	CFR 3.3kΩ 1/16W
R132	9965 000 40695	CFR 3.3kΩ 1/16W
R133	9965 000 39975	CFR 100Ω 1/16W
R134	9965 000 39975	CFR 100Ω 1/16W
R135	9965 000 40311	Peaking coil 33uH 10%

R137	9965 000 40304	CFR 1KΩ 1/16W	R632	9965 000 40513	MOFR 1Ω	d	D402	9965 000 40218	1N4148 150mA/100V
R138	9965 000 40688	CFR 18kΩ 1/16W	R633	9965 000 40108	CFR 5.1kΩ		D403	9965 000 40224	Zener 8V2 1/2W 5%
R139	9965 000 40693	CFR 2.7kΩ 1/16W	R634	9965 000 39976	CFR 10kΩ 1/16W		D404	9965 000 40218	1N4148 150mA/100V
R140	9965 000 39975	CFR 100Ω 1/16W	R635	9965 000 39980	CFR 22kΩ 1/8W		D430	9965 000 40569	BY228
R141	9965 000 39976	CFR 10kΩ 1/16W	R638	9965 000 41085	MOFR 22Ω		D431	9965 100 04906	3A/800V(DO-27)
R142	9965 000 39975	CFR 100Ω 1/16W	R639	9965 000 39976	CFR 10kΩ 1/16W		D433	9965 000 40219	BA158 600V/1A
R143	9965 000 39975	CFR 100Ω 1/16W	R643	9965 000 40701	CFR 47kΩ 1/16W		D450	9965 100 05390	TBYW362A/600V
R144	9965 000 39975	CFR 100Ω 1/16W	R644	9965 000 39976	CFR 10kΩ 1/16W		D451	9965 100 05390	TBYW362A/600V
R145	9965 000 39980	CFR 22kΩ 1/8W	R645	9965 100 04844	390Ω 5% 1/6W		D452	9965 000 40219	BA158 600V/1A
R147	9965 000 40687	CFR 1.8kΩ 1/16W	R647	9965 100 05394	RESIS 0.51 OHM 1W 5%		D501	9965 000 40218	1N4148 150mA/100V
R148	9965 000 40695	CFR 3.3kΩ 1/16W	R648	9965 000 39980	CFR 22kΩ 1/8W		D502	9965 000 40219	BA158 600V/1A
R149	9965 000 40695	CFR 3.3kΩ 1/16W	R649	9965 000 40000	CFR 2.2kΩ		D503	9965 000 40218	1N4148 150mA/100V
R151	9965 000 40122	MOFR 39kΩ	R650	9965 100 05380	430Ω 5% 1/16-1/6W		D504	9965 000 40219	BA158 600V/1A
R401	9965 000 40700	CFR 4.7kΩ 1/16W	R701	9965 000 40701	CFR 47kΩ 1/16W		D505	9965 000 40218	1N4148 150mA/100V
R404	9965 000 39975	CFR 100Ω 1/16W	R702	9965 000 40701	CFR 47kΩ 1/16W		D506	9965 000 40219	BA158 600V/1A
R405	9965 100 04848	5.6kΩ 5% 1/16-1/6W	R705	9965 000 40687	CFR 1.8kΩ 1/16W		D603A	9965 100 05391	Rectifier 800V/1.5A
R406	9965 000 40774	MOFR 1KΩ	R706	9965 000 40687	CFR 1.8kΩ 1/16W		D603B	9965 100 05391	Rectifier 800V/1.5A
R407	9965 000 40001	CFR 22kΩ	R707	9965 000 40701	CFR 47kΩ 1/16W		D603C	9965 100 05391	Rectifier 800V/1.5A
R409	9965 100 04841	27kΩ 5% 1/16-1/6W	R708	9965 000 40701	CFR 47kΩ 1/16W		D603D	9965 100 05391	Rectifier 800V/1.5A
R412	9965 100 04841	27kΩ 5% 1/16-1/6W	R709	9965 000 40701	CFR 47kΩ 1/16W		D605	9965 000 40219	BA158 600V/1A
R413	9965 000 39977	CFR 100kΩ	R710	9965 000 40701	CFR 47kΩ 1/16W		D620	9965 100 07483	High Speed Rect. RU4
R414	9965 000 40698	CFR 39kΩ 1/16W	R711	9965 000 39984	CFR 75Ω 1/16W		D621	9965 000 40219	BA158 600V/1A
R416	9965 000 40304	CFR 1KΩ 1/16W	R713	9965 000 39980	CFR 22kΩ 1/8W		D622	9965 100 05390	TBYW362A/600V
R417	9965 000 40695	CFR 3.3kΩ 1/16W	R717	9965 000 40705	CFR 68Ω 1/16W		D623	9965 100 05406	HSRD 200V/3A
R419	9965 100 05142	270kΩ 5W 1/16-1/6W	R719	9965 000 39975	CFR 100Ω 1/16W		D626	9965 000 40219	BA158 600V/1A
R420	9965 000 39988	CFR 1KΩ 1/4W	R721	9965 000 39984	CFR 75Ω 1/16W		D627	9965 000 40218	1N4148 150mA/100V
R421	9965 100 04838	180Ω 5% 1/16-1/6W	R722	9965 000 39975	CFR 100Ω 1/16W		D761	9965 000 40218	1N4148 150mA/100V
R422	9965 100 04849	680Ω 5% 1/16-1/6W	R723	9965 000 39984	CFR 75Ω 1/16W		D762	9965 000 40218	1N4148 150mA/100V
R423	9965 100 07328	6.2Ω 5% 2W	R724	9965 000 39982	CFR 33kΩ 1/16W		D763	9965 000 40218	1N4148 150mA/100V
R424	9965 000 40689	CFR 2kΩ 1/16W	R725	9965 000 39976	CFR 10kΩ 1/16W				
R425	9965 100 04841	27kΩ 5% 1/16-1/6W	R727	9965 000 39975	CFR 100Ω 1/16W				
R432	9965 000 40491	CFR 270Ω 1W	R728	9965 000 40304	CFR 1KΩ 1/16W				
R433	9965 000 40520	Fusible Res. 0.33Ω 1W	R729	9965 100 04836	1.2kΩ 5% 1/16-1/6W				
R440	9965 100 07699	Fusible Res. 2.2Ω 2W	R742	9965 100 05138	13kΩ 5% 1/16-1/6W				
R441	9965 100 05218	56kΩ 5% 1/16-1/6W	R743	9965 100 05138	13kΩ 5% 1/16-1/6W				
R443	9965 000 40699	CFR 470Ω 1/16W	R744	9965 000 40701	CFR 47kΩ 1/16W				
R450	9965 100 05160	0.22Ω 5% 2W	R745	9965 000 40701	CFR 47kΩ 1/16W				
R451	9965 100 05160	0.22Ω 5% 2W	R746	9965 000 40701	CFR 47kΩ 1/16W				
R452	9965 100 05395	RESIS 5.6 OHM 1W 5%	R747	9965 000 40701	CFR 47kΩ 1/16W				
R453	9965 000 41086	MOFR 270Ω	R748	9965 000 39979	CFR 150Ω 1/6W				
R454	9965 000 41087	MOFR 33Ω	R763	9965 000 40686	CFR 15kΩ 1/16W				
R457	9965 000 39975	CFR 100Ω 1/16W	R764	9965 000 40704	CFR 6.2kΩ 1/16W				
R459	9965 000 40687	CFR 1.8kΩ 1/16W	R765	9965 000 40304	CFR 1KΩ 1/16W				
R460	9965 000 39975	CFR 100Ω 1/16W	R766	9965 000 40701	CFR 47kΩ 1/16W				
R461	9965 000 39985	CFR 5.6Ω	R768	9965 100 05150	91kΩ 5% 1/4W				
R462	9965 100 05312	0.82Ω 2W	R769	9965 000 40304	CFR 1KΩ 1/16W				
R463	9965 000 40138	MOFR 220Ω	R770	9965 000 40304	CFR 1KΩ 1/16W				
R464	9965 100 05624	NTC 50kΩ 5%	R771	9965 000 39976	CFR 10kΩ 1/16W				
R466	9965 000 40698	CFR 39kΩ 1/16W	R775	9965 000 40701	CFR 47kΩ 1/16W				
R467	9965 000 39980	CFR 22kΩ 1/8W	R776	9965 000 40701	CFR 47kΩ 1/16W				
R468	9965 100 07705	MOFR	R777	9965 000 40701	CFR 47kΩ 1/16W				
R469	9965 000 40524	NTC 5/5A	R778	9965 000 39975	CFR 100Ω 1/16W				
R501	9965 000 39998	CFR 22Ω 1/4W	R779	9965 000 39984	CFR 75Ω 1/16W				
R502	9965 000 40000	CFR 2.2kΩ	R780	9965 000 40701	CFR 47kΩ 1/16W				
R503	9965 000 40491	CFR 270Ω 1W	R851	9965 100 04839	2.2kΩ 5% 1/6W				
R504	9965 000 39998	CFR 22Ω 1/4W	R852	9965 100 05146	8.2kΩ 5% 1/16-1/6W				
R505	9965 000 40509	MOFR 270Ω	R853	9965 000 39979	CFR 150Ω 1/6W				
R506	9965 000 40517	MOFR 15kΩ	R854	9965 000 39986	CFR 10Ω 1/4W				
R507	9965 000 40129	MOFR 220Ω	R855	9965 000 39975	CFR 100Ω 1/16W				
R508	9965 000 40525	CCR 2.7kΩ	R856	9965 000 39975	CFR 100Ω 1/16W				
R510	9965 000 39998	CFR 22Ω 1/4W	R857	9965 000 39976	CFR 10kΩ 1/16W				
R511	9965 000 40000	CFR 2.2kΩ	R858	9965 000 39976	CFR 10kΩ 1/16W				
R512	9965 000 39998	CFR 22Ω 1/4W	R860	9965 000 40304	CFR 1KΩ 1/16W				
R513	9965 000 40491	CFR 270Ω 1W	RL601	9965 100 05413	OMIT-SS-112LM				
R514	9965 000 40509	MOFR 270Ω	VDR601	9965 000 40275	Gas Tube CMQX0680				
R515	9965 000 40517	MOFR 15kΩ							
R516	9965 000 40129	MOFR 220Ω							
R517	9965 000 40525	CCR 2.7kΩ							
R520	9965 000 40000	CFR 2.2kΩ							
R521	9965 000 39998	CFR 22Ω 1/4W							
R522	9965 000 39998	CFR 22Ω 1/4W							
R523	9965 000 40491	CFR 270Ω 1W							
R524	9965 000 40509	MOFR 270Ω							
R525	9965 000 40517	MOFR 15kΩ							
R526	9965 000 40129	MOFR 220Ω							
R527	9965 000 40525	CCR 2.7kΩ							
R528	9965 000 40503	CFR 220kΩ 1W							
R529	9965 000 40492	CFR 33Ω 0.25W							
R600	9965 000 40524	NTC 5/5A							
R601	9965 100 05373	2.2MΩ 5% 1/2W							
R602	9965 100 05397	200kΩ 5% 2W							
R604	9965 000 40698	CFR 39kΩ 1/16W							
R605	9965 000 40691	CFR 220Ω 1/16W							
R606	9965 000 40706	CFR 6.8kΩ 1/16W							
R607	9965 000 40128	MOFR 22Ω							
R608	9965 000 40000	CFR 2.2kΩ							
R609	9965 100 05410	Coke 200μH							
R610	9965 000 40154	High Volt. 8.2MΩ 1W							
R621	9965 100 05160	0.22Ω 5% 2W							
R622	9965 100 05160	0.22Ω 5% 2W							
R624	9965 100 05160	0.22Ω 5% 2W							
R627	9965 100 05366	6.2kΩ 5% 1/4W							
R630	9965 000 40113	CFR 680Ω							
R631	9965 000 39988	CFR 1KΩ 1/4W							

d		
D402	9965 000 40218	1N4148 150mA/100V
D403	9965 000 40224	Zener 8V2 1/2W 5%
D404	9965 000 40218	1N4148 150mA/100V
D430	9965 000 40569	BY228
D431	9965 100 04906	3A/800V(DO-27)
D433	9965 000 40219	BA158 600V/1A
D450	9965 100 05390	TBYW362A/600V
D451	9965 100 05390	TBYW362A/600V
D452	9965 000 40219	BA158 600V/1A
D501	9965 000 40218	1N4148 150mA/100V
D502	9965 000 40219	BA158 600V/1A
D503	9965 000 40218	1N4148 150mA/100V
D504	9965 000 40219	BA158 600V/1A
D505	9965 000 40218	1N4148 150mA/100V
D506	9965 000 40219	BA158 600V/1A
D603A	9965 100 05391	Rectifier 800V/1.5A
D603B	9965 100 05391	Rectifier 800V/1.5A
D603C	9965 100 05391	Rectifier 800V/1.5A
D603D	9965 100 05391	Rectifier 800V/1.5A
D605	9965 000 40219	BA158 600V/1A
D620	9965 100 07483	High Speed Rect. RU4
D621	9965 000 40219	BA158 600V/1A
D622	9965 100 05390	TBYW362A/600V
D623	9965 100 05406	HSRD 200V/3A
D626	9965 000 40219	BA158 600V/1A
D627	9965 000 40218	1N4148 150mA/100V
D761	9965 000 40218	1N4148 150mA/100V
D762	9965 000 40218	1N4148 150mA/100V
D763	9965 000 40218	1N4148 150mA/100V

c e		
IC101	9965 100 07701	uP
IC102	9965 000 40597	8k-BIT IIC EEPROM
IC103	9965 000 40249	KA33V
IC104	9965 000 40247	L7808CV
IC301	9965 100 04918	TDA4865AJ DBS7P
IC601	9965 100 05407	W6556A SANKEN
IC621	9965 100 05369	SE120N SANKEN (120V)
IC622	9965 000 40601	PC817C Sharp
IC740	9965 000 40596	TDA9859
IC760	9965 100 04917	TFA9842AJ PHILIPS
IC761	9965 000 40309	HCF4052BF SGS
IC762	9965 000 40309	HCF4052BF SGS
IC851	9965 100 07712	TDA9850 (IIC Bus)
IC852	9965 100 07713	L78L09CZ SGS TO-92
Q101	9965 000 40237	2SC2717
Q106	9965 000 40232	2SC1815Y/2PC1815
Q107	9965 000 40232	2SC1815Y/2PC1815
Q401	9965 000 40234	2SC2482/3DG2482Y
Q440	9965 000 41191	Trans. FQPF630
Q501	9965 000 40585	2SC4544/3DA4544Y
Q502	9965 000 40239	BF423 PNP (-250V)
Q503	9965 000 40238	BF422 NPN (250V)
Q504	9965 000 40585	2SC4544/3DA4544Y
Q505	9965 000 40239	BF423 PNP (-250V)
Q506	9965 000 40238	BF422 NPN (250V)
Q507	9965 000 40585	

g		
C001	9965 000 40529	33pF 50V
CR1	9965 100 04879	10µF 20% 10V
f		
RD1	9965 000 39986	CFR 10Ω 1/4W
RD2	9965 000 40003	CFR 2.7kΩ
RD3	9965 000 39987	CFR 100Ω
RD4	9965 000 40489	CFR 18kΩ 1W
RD5	9965 000 39989	CFR 10kΩ 1/4W
RR1	9965 000 39986	CFR 10Ω 1/4W
b		
LED	9965 000 40273	LED 3.1mm red
d		
D001	9965 000 40221	Zener 5V1 1/2W 5%
M001	9965 100 05378	IR Rec. HS0038B 38KHz

11. Revision List

Manual xxxx xxx xxxx.0

- First release.